

MIDDLE EAST@WAR No.31

# OPERATION DESERT STORM

VOLUME 2: OPERATION DESERT STORM AND  
THE COALITION LIBERATION OF KUWAIT 1991



E.R. Hooton & Tom Cooper

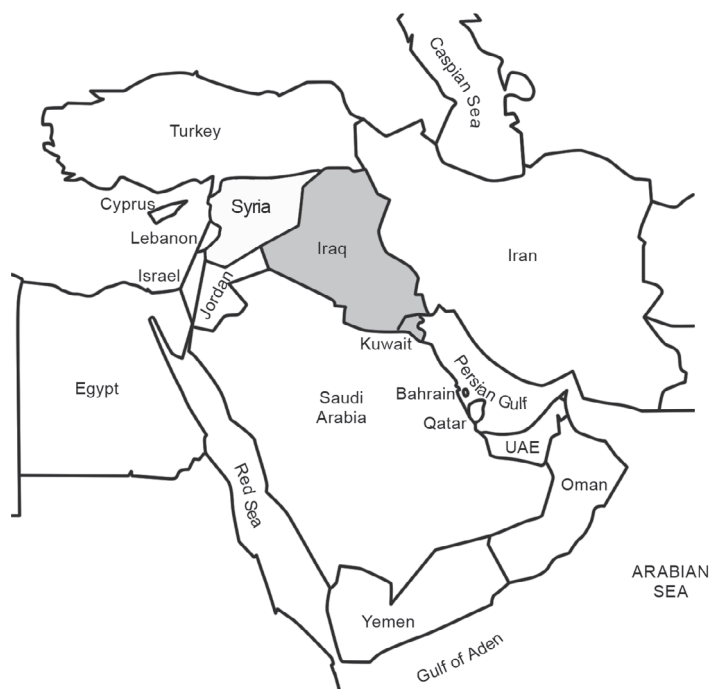
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## NOTE

In order to simplify the use of this book, all names, locations and geographic designations are as provided in *The Times World Atlas*, or other traditionally accepted major sources of reference, as of the time of described events. Similarly, Arabic names are romanised and transcribed rather than transliterated. For example: the definite article al- before words starting with 'sun letters' is given as pronounced instead of simply as al- (which is the usual practice for non-Arabic speakers in most English-language literature and media). Because ranges are measured in feet and nautical miles in international aeronautics, all the ranges and measurements cited in this book are provided in metric and imperial measurements. Note that the US spelling of "Armor/Armored" has been used in US unit titles/proper names but the British spelling "armour" is used for other nationalities and elsewhere.

Helion & Company Limited

Unit 8 Amherst Business Centre, Budbrooke Road, Warwick CV34 5WE, England

Tel. 01926 499 619

Email: [info@helion.co.uk](mailto:info@helion.co.uk)

Website: [www.helion.co.uk](http://www.helion.co.uk)

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# ABBREVIATIONS

<b>AAA</b>	anti-aircraft artillery	<b>MANPAD</b>	man-portable air defence
<b>AAM</b>	air-to-air missile	<b>MiG</b>	Mikoyan i Gurevich (the design bureau led by Artyom Ivanovich Mikoyan and Mikhail Iosifovich Gurevich, also known as OKB-155 or MMZ 'Zenit')
<b>AB</b>	air base	<b>MODA</b>	Ministry of Defence and Aviation (Saudi Arabia)
<b>ADCC</b>	Air Defence Command and Control Centre (RSAF)	<b>MPA</b>	maritime patrol aircraft
<b>ADOC</b>	air defence operations centre (IrAF)	<b>MRAAM</b>	medium range air-to-air missile
<b>AEW</b>	airborne early warning	<b>NARA</b>	National Archives (USA)
<b>AMC</b>	Army Material Command (US Army)	<b>NATO</b>	North Atlantic Treaty Organisation
<b>An</b>	Antonov (the design bureau led by Oleg Antonov)	<b>nav/attack</b>	navigational and attack (avionics suite)
<b>AOI</b>	(The) Arab Organisation for Industrialisation	<b>OCU</b>	Operational Conversion Unit
<b>ArCent</b>	(US) Army Central Command	<b>OTU</b>	Operational Training Unit
<b>ARM</b>	anti-radar/radiation missile	<b>RAF</b>	Royal Air Force (of the United Kingdom)
<b>ASCC</b>	Air Standardisation Coordinating Committee	<b>RCC</b>	Revolutionary Command Council (Iraq)
<b>ATACMS</b>	Army Tactical Missile System (US Army)	<b>RGFC</b>	Republican Guards Forces Command (Iraq)
<b>ATGM</b>	anti-tank guided missile	<b>RHAW</b>	radar homing and warning (system)
<b>ATMS</b>	automated tactical management system	<b>RSAF</b>	Royal Saudi Air Force
<b>AWACS</b>	airborne early warning and control system	<b>RSLF</b>	Royal Saudi Land Force
<b>AWACW</b>	Airborne Warning and Control Wing (USAF)	<b>RRF</b>	Ready Reserve Fleet
<b>BAe</b>	British Aerospace (now BAE)	<b>RWR</b>	radar warning receiver
<b>BAI</b>	battlefield air interdiction	<b>SAM</b>	surface-to-air missile
<b>BOC</b>	Base Operations Centre (RSAF)	<b>SANG</b>	Saudi Arabian National Guard
<b>bpd</b>	barrels per day	<b>SAR</b>	search and rescue
<b>CALCM</b>	conventional air-launched cruise missile	<b>SEAD</b>	suppression of enemy air defences
<b>CENTCOM</b>	Central Command (US Military)	<b>SHF</b>	super high frequency
<b>CIA</b>	Central Intelligence Agency (USA)	<b>SIGINT</b>	signals intelligence
<b>COIN</b>	counterinsurgency	<b>SINCGARS</b>	Single-Channel Ground and Airborne Radio System
<b>COMINT</b>	communications intelligence	<b>SIS</b>	Secret Intelligence Service (of Great Britain)
<b>DIA</b>	Defence Intelligence Agency (USA)	<b>SOC</b>	sector operations centre (IrAF & RSAF)
<b>DMI</b>	Directorate of Military Industries (Iraq)	<b>SSMD</b>	Surface-to-Surface Missile Directorate (Iraq)
<b>ECM</b>	electronic countermeasures	<b>STOL</b>	short take-off and landing
<b>ECCM</b>	electronic counter-countermeasures	<b>Sqn</b>	squadron
<b>ELINT</b>	electronic intelligence	<b>Su</b>	Sukhoi (the design bureau led by Pavel Ossipovich Sukhoi, also known as OKB-51)
<b>EMED</b>	Electrical-Mechanical Engineering Directorate (Iraqi Army)	<b>Tacfire</b>	Tactical Fire Direction System (US Army)
<b>FSS</b>	Fast Sealift Ships	<b>TEL</b>	transporter/erector launcher (essentially: self-propelled launcher)
<b>GCC</b>	Gulf Co-operation Council (formal designation is actually 'The Co-operation Council for the Arab States of the Gulf')	<b>TLAM</b>	Tomahawk Land Attack Missile (US Navy)
<b>GMID</b>	General Military Intelligence Directorate (Iraq)	<b>TRADOC</b>	Training and Doctrine Command (US Army)
<b>GP</b>	general purpose (bomb)	<b>UAE</b>	United Arab Emirates
<b>HE</b>	high explosive	<b>UHF</b>	ultra-high frequencies
<b>HET</b>	heavy equipment transporter	<b>USAF</b>	United States Air Force
<b>IADS</b>	integrated air defence system	<b>USN</b>	US Navy
<b>IAP</b>	international airport	<b>USSR</b>	Union of Soviet Socialist Republics (also Soviet Union)
<b>IrAAC</b>	Iraqi Army Aviation Corps (official designation 1980-2003)	<b>VHF</b>	very high frequencies
<b>IrAF</b>	Iraqi Air Force (official designation 1958-2003)	<b>VTOL</b>	vertical take-off and landing
<b>Il</b>	Ilyushin (the design bureau led by Sergey Vladimirovich Ilyushin, also known as OKB-39)	<b>VVS</b>	Voyenno-Vozdushnye Sily (Soviet Air Force)
<b>JCS</b>	Joint Chiefs of Staff (USA)		
<b>JIC</b>	Joint Intelligence Committee (of Great Britain)		
<b>KLF</b>	Kuwait Land Forces (Kuwaiti Army)		
<b>KOC</b>	Kuwait Oil Company		
<b>KTO</b>	Kuwait Theatre of Operations		
<b>LANTIRN</b>	Low Altitude Navigation Targeting Infrared for Night		
<b>MAC</b>	Military Airlift Command (USAF)		



## INTRODUCTION AND ACKNOWLEDGEMENTS

On the morning of 2 August 1990, the citizens of the State of Kuwait (Dawlat al-Kuwait) awoke to find long columns of Iraqi armoured vehicles driving down their boulevards and dozens of Iraqi helicopters flying overhead. Sounds of fighting were rumbling from the distance and then military aircraft appeared in the sky: first those of the Kuwait Air Force (KAF), then those of the Iraqi Air Force (IrAF). Thus began an Iraqi invasion of Kuwait: an enterprise planned and organised only days before it was launched, but one that was to trigger the last major conflict of the 20th century – and help create the frighteningly uncertain world of the 21st century.

While most histories of the following war – colloquially known as the ‘Gulf War’ or ‘Desert Storm’ in the USA in particular – start with the Iraqi invasion of Kuwait, they usually pay little attention to the history of the two nations and their mutual relations, and even less so to their relations with their neighbours. Similarly, while much has been published about US, British and French air warfare during Operation Desert Storm, little has been published about Iraqi operations (notable exceptions include books by James Woods and Pesach Malovany). Sadly, and much to the annoyance of Iraqi and Kuwaiti officers, even most serious accounts describe their operations either in derogatory terms or focussing upon ‘Russian influence’. With the notable exceptions of Mr Woods and Colonel Malovany, ignorance drives most English language accounts of the events and Iraqi intentions in 1990–1991. In fact, most accounts about operations Desert Shield/Desert Storm focus upon the undeniably dominating role of US forces, with the Iraqi role reduced to what in theatrical terms is described as ‘noises off’.

The purpose of this book is not only to present the ‘other’ – Iraqi – perspective of related affairs, but also to put numerous important background items within their context. Many people have assisted us, but the authors would especially like to express their appreciation to Ms Annette Amerman, Branch Head & Historian, Historical Reference Branch, US Marine Corps History Division for her valuable assistance. Furthermore, our gratitude is due to Major-General Makki (Iraqi Army, retired) and to Brigadier-General Ahmad Sadik (Iraqi Air Force Intelligence Department, retired) for patiently providing information and advice. Ali Tobchi has helped not only with information and photographs, but with translation of diverse publications and documents, too, while Milos Sipos supplied much minute detail on the Iraqi Air Force. Major Phil Watson, who served in Operation Granby with 9th/12th Royal Lancers (Princes of Wales’s), which formed part of the Armoured Delivery Group of the British Army, generously shared his personal photo archive for use in the illustration of this volume.

### 1

## HAMMER FROM THE SKY

The US Air Force (USAF) began planning its reaction to the Iraqi invasion even before the first Americans arrived on the Arabian Peninsula following US Army Central Command’s (ArCent) leader General H Norman Schwarzkopf’s request of 8 August. Because Lieutenant-General Charles A ‘Chuck’ Horner’s staff were busy planning the assembly of US air power on the Arabian Peninsula, offensive planning was assigned to Colonel John A. Warden, the

Pentagon’s leading authority on air power. He was also the USAF Deputy Director of Plans and assembled a staff dubbed ‘Checkmate’ in a Pentagon basement office.

They produced ‘Instant Thunder’, which emphasised attacks upon strategic targets such as the Iraqi command and control capabilities, the oil industry, electricity, communications, strategic offensive and defensive forces.<sup>1</sup> It reflected Warden’s belief in striking enemy ‘centres of gravity’ and, despite giving a low priority to attacks on enemy ground forces, Schwarzkopf approved it on 10 August, with the proviso that it included forces based in Turkey. But when the Chairman of the Joint Chiefs of Staff (JCS), Lieutenant General Colin L. Powell was briefed the next day he questioned whether there were the resources to meet the objectives and directed that ‘Instant Thunder’ become a joint plan with greater emphasis upon attacking enemy armour.

Warden revised the plan from 11–17 August adding the goals of winning air superiority over the KTO and striking both command and control capabilities as well as armour within the theatre while adding chemical weapon stocks to the target folder. He presented it to Schwarzkopf on 17 August and as he did so Schwarzkopf scribbled the outline of a four-phase campaign, Desert Storm, incorporating ‘Instant Thunder,’ the suppression of air defences in Kuwait, the halving of enemy ground forces, and the ground attack. Although ‘Instant Thunder’ still assigned attacks on ground forces a low minor priority he approved the plan and sent Warden to brief Horner in Riyadh.

Since 12 August Horner, the Coalition air commander, had planned an air campaign to meet an Iraqi offensive and this focused upon interdiction of troops, including the use of B-52s, achieving air superiority (counter-air), and then planning for D-Day, a Coalition ground offensive. On 17 August Horner asked Brigadier General Buster C. Glosson, Deputy Commander of Joint Task Force Middle East, to prepare for both a ‘strategic’ and ‘tactical’ air campaign. This was drafted over the next three days as the ‘D-Day Game Plan’ with enemy forces remaining the priority although there was a ‘strategic’ element against targets which supported ground forces.<sup>2</sup> Horner felt Washington was interfering by calling in Warden whose briefing on 20 August was received with disdain, partly for personal reasons and partly because of the low priority assigned to striking ground forces. Horner pointedly requested three of the staff planners to remain in theatre but Warden was sent home.

Horner and Glosson were distinguished combat airmen who were determined to avoid the mistakes of ‘Rolling Thunder’ over North Vietnam in 1965–1968. ‘Chuck’ Horner, aged 54, had joined the USAF Reserve through the University of Iowa and had flown 110 Wild Weasel (electronic support) missions and would retire in September 1994 having flown 5,300 hours. Glosson, aged 48, would retire with 3,600 hours and had been the USAF deputy chief of staff for plans and programmes until September 1988.

On 22 August Horner asked Glosson to draft an outline offensive air campaign and he created the Special Planning Group or ‘Black Hole’ which met in a basement storage room in RSAF headquarters in Riyadh.<sup>3</sup> Heavily influenced by the Israeli 1982 air campaign in the Lebanese Bekaa valley, it incorporated ‘Instant Thunder’ in a four-phase plan including a more surgical strategic bombing campaign. Here too planning was hindered by intelligence problems, in part self-made because the USAF operational forces showed little interest in distributing data although planning depended upon precision strikes.

The phases were a strategic campaign, achieving air superiority over the KTO, reducing enemy forces and chemical weapon delivery

systems, and finally supporting the liberation of Kuwait. Horner and Glosson viewed it as sequential, but overlapping and simultaneous, phases. Following presentations to Secretary of Defense Cheney, the Joint Chiefs and Powell between 25 August and 12 September then developed the plan with greater focus upon destroying up to half of the KTO enemy ground forces before the ground offensive. Planning involved other members of the Coalition informally only from September, with the RAF formally joining the following month and the Saudis late in November. The revised plan, which made the units of the Republican Guards Forces Command (RGFC, colloquially 'Guards') a priority, was then presented to the Joint Chiefs on 10 October.

Following major reviews on 8 November and 14 November, the ultimate plan was presented by Horner to Cheney and Powell on 20 December although there was tinkering right up to 17 January. When Horner briefed Schwarzkopf on the revised air plan on 15 January 'Stormin Norman' was furious. Schwarzkopf wanted simultaneous phases with the full weight of air power falling upon Iraqi ground forces in the KTO. This meant last minute changes to the air plan and in particular the detailed 300-page Air Tasking Orders (ATO), which were difficult to prepare and distribute, as the two corps commanders wanted a week of sustained air attacks to erode enemy strength along their line of advance from G-Day, the day the land offensive began. No-one knew when this would be but as their targets were constantly changing the corps commanders' requests were ignored.

The means of executing the air offensive steadily increased from the moment 23 F-15Cs from 71st TFS arrived on the afternoon of 8 August at Dhahran AB after flying, fully armed, 12,800 kilometres non-stop from Langley AFB, Virginia in 15 hours.<sup>4</sup> A stream of USAF aircraft was followed by the Marines, whose VMFA-451 Hornets arrived in Shaik Isa, Bahrain, on the afternoon of 23 August.<sup>5</sup> The emphasis upon precision attack meant that in addition to the normal F-15s, F-16s and A-10s, a wing of F-111Fs with bomb laser-guidance systems, rather than the 'dumb' F-111Es, were deployed while on 23 August Schwarzkopf requested a LANTIRN-equipped F-16 squadron from Europe while he also received F-117 Nighthawk stealth bombers.<sup>6</sup>

The last of the tactical fighters arrived on 2 September. Support aircraft also arrived, indeed five E-3A Sentry AWACS just beat the 71st TFS into Dhahran AB. USAF EF-111 Ravens reached Taif while Marine EA-6Bs landed at Shaikh Isa and by 5 September there were 36 F-4G 'Wild Weasel' SEAD aircraft in theatre as well as six EC-130 Airborne Battlefield Command and Control Center (ABCCC) aircraft at Sharjah. On 12 September the last combat

**TABLE 1: FIXED-WING AIR BUILD UP IN THE ARABIAN PENINSULA<sup>7</sup>**

SERVICE	AIRCRAFT	1 SEPT	1 OCT	1 NOV	1 DEC	1 JAN
USAF	Total	528	647	689	742	952
	Combat	308	362	366	387	528
US NAVY	Total	65	148	143	156	156
	Combat	49	106	106	108	108
US MARINES	Total	115	146	146	146	205
	Combat	97	118	118	118	173
NATO	Combat	40	92	106	106	126
ARAB	Combat	277	277	277	277	277

**TABLE 2: US NAVY AIRCRAFT CARRIER DEPLOYMENTS IN THE MIDDLE EAST, JANUARY – MARCH 1991**

SHIP	NUMBER	DEPLOYMENT DATES
USS <i>America</i>	CVN-66	15 January – 4 March 1991
USS <i>Eisenhower</i>	CVN-69	8-24 August 1990
USS <i>Independence</i>	CV-42	2 October – 4 November 1990
USS <i>John F. Kennedy</i>	CV-67	6 September 1990 – 12 March 1991
USS <i>Midway</i>	CV-41	2 November 1990 – 14 March 1991
USS <i>Ranger</i>	CV-61	13 January – 19 April 1991
USS <i>Saratoga</i>	CV-60	21 August – 21 September 1990, 23 October – 9 December 1990, 6 January – 11 March 1991
USS <i>Theodore Roosevelt</i>	CVN-71	14 January – 20 April 1991

aircraft under Phase I of Desert Shield, five AC-130 gunships, landed at King Fahd IAP. Unlike the US Marine Corps, the USAF and its NATO allies deployed few full squadrons in their entirety, instead usually sending squadron headquarters whose strength was made up with detachments from a variety of squadrons.

President Bush's November decision to reinforce the theatre led Cheney on 16 November to order the despatch of 283 aircraft, many from NATO bases. The Phase II air deployment began with the arrival on 29 November of F-111Fs at Taif AB, Saudi Arabia and by the beginning of 1991 Horner had almost all the USAF's precision attack aircraft, most of the Nighthawks and 75% of Wild Weasels.<sup>8</sup> To ease command of both tactical fighter and combat support aircraft, including AWACS and reconnaissance aircraft, Horner formed the 14th and 15th Air Divisions (Provisional), the former under Glosson and the latter under Brigadier General Glenn A. Proffitt. They joined Arab aircraft from the Saudi, Bahraini, Kuwaiti, Omani, Qatari and UAE air forces.

On 7 September Washington agreed that Riyadh could purchase 24 F-15C/Ds with the first arriving on 20 September. On 10 November a Saudi F-15 pilot defected to Sudan.<sup>9</sup> Cairo offered combat aircraft in August, but the Saudis pointed out their skies at that time were crowded and the offended Egyptians did not respond to a later Saudi request for aircraft.<sup>10</sup>

NATO also despatched aircraft beginning on 11 August when the British implemented Operation Granby, the military effort on the Arabian Peninsula, by despatching 6 Tornado F.3s from Cyprus and 12 Jaguar GR.1As from the United Kingdom, with three Nimrod MR.2Ps flying the next day. The last reinforcement of four Buccaneer S.2s was sent on 26 January. Across the Channel, Paris despatched Mirage 2000Cs, Mirage F.1CRs and Jaguars to support Operation Daguet from 16 September and later Mirage F.1Cs were deployed to Qatar. During September there were further NATO





At the tactical level, the aerial offensive against Iraq was led by F-117 Nighthawks of the 37th TFW, USAF – aircraft based on revolutionary 'stealth' technology, which made them extremely hard to track with radar. This row of F-117s was photographed towards the end of the war and shows most of them decorated with mission markings. (US DoD)



A pair of F/A-18C Hornets from VFA-83 (assigned to Carrier Air Wing 17), seen while overflying USS *Saratoga* (CV-60) in the Red Sea, November 1990. (US DoD)

reinforcements including a dozen Italian Tornado GRs deploying in Operation Locusta (Locust) to ad-Dhafra in the UAE on 25 September, while 24 Canadian CF-18s flew to Qatar for Operation Friction.

Available outside of the Arabian Peninsula, but within range of targets, were B-52G bombers initially based on Diego Garcia. On 24 August Horner was given operational control of SAC's strategic reconnaissance and tanker forces supporting the theatre which were assigned to the newly created 17th Air Division (Provisional). The numbers of B-52s slowly grew with 54 in November, some moving into bases in Europe, Turkey and Egypt. US Navy aircraft carriers were also available although their numbers fluctuated and

non-nuclear powered carriers would fight their last battles in this theatre.<sup>11</sup> Two US Navy battleships, the last battleships to see action, were deployed; USS *Wisconsin* (BB-64) on 24 August and USS *Missouri* (BB-63) in November. These two vessels were armed with 16-inch guns which could be directed by Unmanned Aerial Vehicles (UAV) and also carried RGM-109 Tomahawk long-range land-attack missiles. Nine cruisers, four destroyers and two submarines also carried Tomahawk.

The Strategic Air Command (SAC) supported both US and foreign transfers by assigning 186 tankers to support Desert Shield, including 44% of the KC-135 Stratotanker fleet and 75% of the KC-10 Extender fleet. By 20 December, SAC tankers had flown 13,129 sorties in support of Desert Shield and supplied 25,028 Coalition aircraft with 15,200 tonnes of fuel. As the prospect of a Coalition offensive approached SAC reinforced the tanker force to 224 aircraft by 13 January.<sup>12</sup>

The strategic airlifter effort was augmented by 96 C-130 Hercules, a third of the fleet, which distributed personnel and material around the Arabian Peninsula, and were later reinforced by another 35 transports. The last two squadrons arriving at Sharjah and al-Ain air bases on 8 September later supported by the mobilisation on 1 October of Air Reserve and Air National Guard units and the arrival of three Royal New Zealand Air Force Hercules. The American

aircraft alone would deliver 300,000 tons of cargo and 209,000 troops. On 31 October, the theatre's airlift forces were placed under the 1610th Airlift Division (Provisional).

From early August, Coalition aircraft were extremely active<sup>13</sup> and while they did not fire their weapons in anger, on the morning of 21 November a US Army AH-1 Cobra attack helicopter accidentally launched an anti-armour missile into one of Horner's ammunition dumps at King Fahd IAP causing some damage.<sup>14</sup> The activity focused upon maintaining a shield over the Arabian Peninsula, electronic, electro-optic and optical reconnaissance north of the Saudi border, and training.<sup>15</sup>

<b>TABLE 3: OVERALL DESERT SHIELD AIR ACTIVITY<sup>16</sup></b>					
DATE	US AIR FORCE	US NAVY	US MARINES	ALLIES	TOTAL (US TAC AIRLIFT)
August/September 90	2,402	396	495	407	3,700 (895)
October 90	2,480	261	424	565	3,730 (699)
November 90	2,673	518	472	1,210	4,873 (684)
December 90	2,215	615	453	947	4,230 (901)
January 91	1,768	281	296	764	3,109 (658)
<b>Totals</b>	<b>11,538</b>	<b>2,071</b>	<b>2,140</b>	<b>3,893</b>	<b>19,642 (3,837)</b>

The RSAF held the aerial shield initially with a 24-hour Combat Air Patrol (CAP) supported by Sentries which were quickly augmented by USAF aircraft. From early October Iraqi reconnaissance and fighter activity meant the CAP was extended into western and central Iraqi-Saudi border regions. Given the problems with the Saudi air defence command system, the USAF flew in their own to augment their host's system from 26 September. Within a month however, there were potentially serious problems co-ordinating air defence, although on 22 December the Saudi-based system had a successful test link with the NATO Airborne Warning and Control System in Turkey.

The Arabian Peninsula shield was reinforced by the 11th Air Defence Artillery Brigade with MIM-104C Patriot PAC-1 (Patriot Advanced Capability) surface-to-air missile systems for use against manned aircraft. In the late 1980s PAC-2 improvements began to be introduced to intercept ballistic missiles; these were introduced into the 11th Brigade and by 12 September the five batteries had 32 PAC-2 systems which were deployed in all 16 batteries by mid-January. Patriot was a very sophisticated system and on 24 October half of the batteries were briefly non-operational due to repairs to their AN/MPQ-53 radar, but on the verge of Desert Storm, 15 Patriot and all 22 of the Army's HAWK batteries were operational.

In addition to receiving satellite imagery CENTCOM also benefitted from a wide variety of platforms to probe behind the enemy lines.<sup>17</sup> The first USAF aircraft used were SAC RC-135 Rivet Joints which began Burning Wind SIGINT missions on 9 August and within two days were providing 24-hour coverage. On 29 August SAC's U-2 photoreconnaissance aircraft and TR-1 tactical reconnaissance aircraft with side-looking radar began operations and on 8 September the first medium-altitude photographic reconnaissance missions were flown by RF-4Cs to provide vital visual imagery.<sup>18</sup> By 2 December Horner's reconnaissance arm had flown 469 tactical sorties, 421 strategic sorties and 2,800 electronic sorties, while AWACS which both supported the shield and monitored IrAF activity had flown 253 sorties. One reconnaissance system which was late to the table was the E-8 JSTARS battlefield surveillance system. Schwarzkopf requested a prototype system as early as 10 August but in early September the Joint Chiefs rejected the request arguing: "Desert Shield is not suitable in time or place for introduction of Joint STARS." Only at the last minute did they change their mind with the first two aircraft arriving on 12 January, along with four vehicles to provide 44 remote terminals.<sup>19</sup>

Training was vital to strengthening aircrew skills and co-ordination between allied air forces. The first exercise was Arabian Gulf on 10 August and on 6 September small-scale electronic combat exercises began, followed two days later by integrated-package training. The integrated package would be the means of prosecuting the air war and was an aerial task group which combined strike with fighter

aircraft, and later support aircraft. Initially training involved only single services in ever-growing packages, but gradually it developed into multi-service packages and then multi-national packages with Saudi aircraft joining a USAF package on 18 September. By early October multi-national packages of up to 50 aircraft were the norm.

On 24 October, a three-day

exercise, Initial Hack, began simulating a D-Day Air Tasking Order including pre- and post-strike air refuelling, airfield attacks, airfield defence, close air support and command and control. It involved more than 300 simulated combat sorties and 200 other sorties in support of 18 air packages involving some 40 coalition air units.

From the end of October training exercises were used to deceive the IrAF, with aircraft approaching close to the border then turning back at the last minute both to test enemy reactions and to get them used to seeing approaching formations.<sup>20</sup> By mid-November the airmen were planning exercises to simulate the ATOs for D-Day plus 1 with Imminent Thunder involving 1,000 coalition aircraft flying 4,000 sorties. The Tactical Air Control Centre (TACC) was reorganised on 17 December, as preparations for an offensive continued – including changing aircraft call signs – while, from 12 January the airmen began the transition to operational flying with aircraft being armed as sorties dropped by 60%: in turn, on the eve of the air offensive USAF serviceability had reached 94%.

The bulk of Coalition air activity took place around the Arabian Peninsula, but Turkey was concerned about the implications of the Kuwait invasion and NATO aircraft strengthened Ankara's air defences and then staged Exercise Display Determination 90 in September. As early as 4 September, General Robert C. Oaks, commander of the US Air Force in Europe, proposed a second air front from Turkey and by 12 October he had begun detailed planning, aided by Ankara's agreement in mid-October to retain some aircraft deployed for Display Determination 90 at Incirlik AB. On 20 December Turkey requested that NATO reinforce the Turkish Air Force and three days later General John Galvin, US Commander in Europe, established Joint Task Force Proven Force as a Turkey-based aerial deterrent under Oaks' Operations Chief, Major General James L. Jamerson.<sup>21</sup> On 7 January Ankara approved the deployment of an advance Proven Force party to Incirlik AB, and later increases in USAF strength to 157 combat and combat support aircraft.

In addition, there were 1,203 Coalition combat aircraft on the Arabian Peninsula and 320 either in the surrounding waters or foreign bases as the 'cold' war prepared to go 'hot in the Arabian Peninsula'.<sup>22</sup> In the New Year of 1991 the Coalition gradually built up the number of combat and support sorties flown close to the Iraqi border. The final preparations were completed, and H-Hour was selected as 03.00 on 17 January 1991 because it was assessed that that would be the time when the Iraqi defences were at their weakest.

While it might not have known the full numbers facing it, the IrAF prepared for the wrath to come apparently confident it would distinguish itself. In late September, a committee was established under Lieutenant General Amer Muhammad Rashid, an IrAF officer who was also head of the Military Industries Authority, with



the General Staff's heads of Operations and Planning, and the deputy head of Military Intelligence together with the deputy heads of the IrAF and Air Defence Command.<sup>23</sup> The airmen were acutely conscious of the Coalition's technological superiority which they were certain could paralyze both the IrAF sensor and C2 systems. They also pointed out the severe difficulties of any form of offensive operation but drew up two plans against the Coalition and Israel. The first involved air defence and strike missions in support of ground and naval forces while the second involved revenge air attacks upon Israeli targets.<sup>24</sup>

Baghdad's Air Force Intelligence Directorate (AFID) sought to discover enemy strength and intentions using radar and communications intelligence (COMINT), and researched US air operations against Libya in 1986 and Israeli operations over Lebanon of 1982. The alarming conclusions of this research were that the country, especially southern and central Iraq, faced a severe electronic threat, with massive air and cruise missile strikes around the clock against their key command and communication nodes, particularly Kari, and against their ground forces, although the north was expected to remain largely beyond the enemy's reach.

The AFID gave each Air Defence Sector (ADS) a list of potential targets for use in defensive plans which were submitted to Air Defence Commander Lieutenant General Shahin Yasin Muhammad. He then assigned them the necessary resources which would be used with maximum local initiative while constantly updating the Kari IADS in Baghdad. As the scale of the threat was recognised, General Shahin devolved control to the ADS and their sector operational control (SOC) centres. Commanders were warned that there would be a vigorous attempt to suppress their radars with anti-radiation missiles. There were plans for supporting an Iraqi offensive or attacking Dharan, but it was recognised such offensive operations would be of short duration.<sup>25</sup>

A defensive strategy based upon ground-based weapons was Iraq's only realistic option to conserve pilots. It was anticipated that interceptors would have only a limited window of opportunity after which the destruction of the infrastructure would prevent their operation. The IrAF's role, therefore, was simply to survive, stage limited air interceptions, and attack selected targets to support the army and, possibly, strike Israel. Offensive operations against desalination plants, air bases and oil refineries were considered between September and November but the scarcity of information in the target folders and the probability of high losses meant these were not serious options. Interestingly, a GMID report from 6 August 1990 suggested that the IrAF transfer some aircraft abroad to avoid being caught exposed at their bases.<sup>26</sup>

Saddam was confident that his air defence forces would defend not only 160 sites, including NBC (Nuclear, Biological and

**TABLE 4: KARI ORGANISATION**

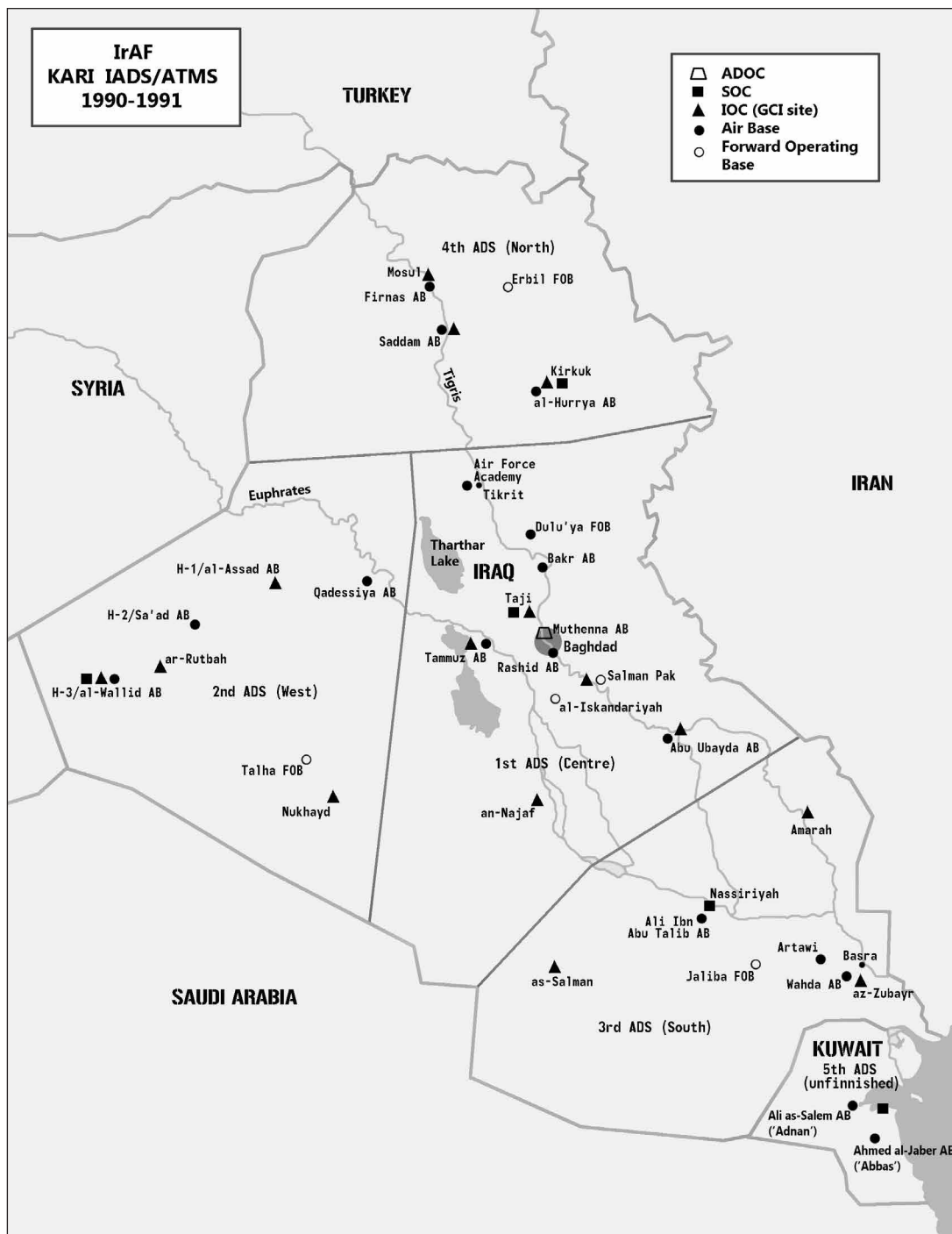
ADS	HEADQUARTERS	COVERAGE	MISSILE BRIGADES	MISSILE BATTERIES	WARNING AND CONTROL REGIMENTS
1	Al Tij camp	Central/Eastern	145, 146	16	50, 51, 52
2	Al Waleed (H3) AB	Western	147	11	12
3	Imam Ali AB	Southern	148, 149	17	71, 72, 73
4	Al Hurriya AB	Northern	195	6	81, 82

**TABLE 5: DISTRIBUTION OF IRAQI AIR DEFENCE ASSETS<sup>31</sup>**

TYPE	MOSUL/KIRKUK	BAGHDAD	H-2/H-3	TALIL/JALIBAH	BASRA	TOTAL
Missiles	122	552	90	10	118	892
AA sites	39	380	138	73	167	797
Guns	110	1,267	281	180	442	2,280
SA-2	1	10	1	1	2	15
SA-3	12	16	-	-	-	28
SA-6	-	8	6	-	8	22
SA-8	1	15	-	-	-	16
Roland	2	9	6	2	5	24
ZSU-23-4	-	8	-	-	5	13
S-60	8	10	3	2	14	37

Chemical) warfare sites such as Mashroo (Project) 777 in Iraq, but others in the 19th Province.<sup>27</sup> At the heart of the Iraqi national air defence was the computer-based Kari air defence system to meet threats from the east (Iran) and the west (Israel and to a lesser degree Syria) for which Baghdad began to plan in 1974, accelerating the programme after the 1981 Israeli air attack on its Osirak nuclear reactor and leading to French electronics firm Thomson-CSF receiving a contract.<sup>28</sup> It was designed, like contemporary Soviet systems, to be operated by men with limited secondary education with considerable responsibility laying on the shoulders of the better educated officers. It was an extremely hierarchical system and damage to key sites and the communications system could render it ineffective.<sup>29</sup> At its heart was the Air Defence Operations Centre (ADOC) established in 1973 at al-Muthanna AB – the former Baghdad International Airport – in the Baghdad suburb of Mansour, with regional SOCs, each with Interceptor Operations Centres (IOC). Some 14 radars were transferred to Kuwait where work started on a fifth ADS at the Ali as-Salem AB. By mid-January the infrastructure was complete, including alternative command posts and back-up wire communications, but it does not seem to have become operational.<sup>30</sup> The ADOC was responsible for strategic direction, compiling the national tactical air picture and establishing air defence priorities, it also had co-ordinators for fighter, surface-to-air missile, surface-to-air artillery, radar and communications as well as electronic countermeasures.

The SOCs were responsible for battle management using interceptors, surface-to-air missile (SAM) and anti-aircraft artillery batteries supported by surveillance and weapon control radars and visual observation posts. They could track 120 targets and compiled the regional tactical picture which was relayed to the ADOC, but they also decided how to engage the targets, even the type of intercept or the number of missiles to be fired. The IOCs would then execute the task aided by up to six radar reporting posts together with voice or data reports from observation and command posts using voice telephone or simple data input pads. They could track



A map of the IrAF's Kari IADS, as of August 1990 – January 1991. (Map by Tom Cooper)

only a limited number of targets, but each site had two vehicles in a concrete shelter which could disperse its capabilities if necessary.

The ADOC had direct land lines to the SOCs and both had modems to switch between landline and wireless communications while the SOCs were linked to the IOCs by dedicated telecommunications links for voice and data. The whole system featured several means of communication to provide redundancy with multiple hardened communications links including buried fibre-optic cable, and microwave and tropo-scatter communications links to air bases and air defence batteries. These extended to the 100 reporting and control posts where operators had hand-held pads on which the observer entered heading, altitude and formation size data then transmitted by pushing a button.

There were 28 primary, and some 275 secondary, surveillance radars in approximately 100 sites, of which 15-20 were static, with long-range E/F-band (2.6-3 GHz) radars – such as P-35M and P-37

(ASCC/NATO-codename Bar Lock) – supported by PRV-11 (ASCC/NATO-codename Side Net) E-band height finders augmented by Thomson-CSF TRS 2205 Volex III, and Thomson-CSF TRS-2215 and 2230 with TRS-2100 Tiger S medium-range 'gap-fillers'.<sup>32</sup> Another 500 radar sensors supported missile and AAA batteries.<sup>33</sup>

Soviet-made surface-to-air missile systems (SAMs) like the S-75 (ASCC/NATO-codename SA-2 'Guideline') and S-125 (ASCC/NATO-codename SA-3 'Goa') were the backbone of the Iraqi air defence system, with a reported 25 batteries supported by an I-HAWK battery captured in Kuwait.<sup>34</sup> Six Soviet-made 2K12 (ASCC/NATO-codename SA-6 'Gainful') battalions were assigned to shield military production facilities as well as al-Waleed AB near Jordan, while four battalions equipped with the French-made Roland SAMs shielded military and civil sites.<sup>35</sup> In addition to missiles, the Iraqis continued to deploy 7,600 guns, including up to 1,800 in Baghdad alone, ranging from 130mm KS-30 to 14.5mm machineguns, the latter on roof tops or even 10-13ft berms.<sup>36</sup> The IADS relied upon a tightly integrated network of early warning radars, SAMs and AAA units and would activate their interceptors sparingly, preferably against carefully selected targets.

The IrAF had 102 interceptors<sup>37</sup> and while US Intelligence, in Speartip 014-90, had a good picture of the force it was far from perfect.<sup>38</sup> The Office of Naval Intelligence, for example, assessed IrAF fighter strength at 29 MiG-29s, 29 Mirage F.1EQ/EQ-2/EQ-4s and five Mirage F.1EQ-5/EQ-6s, 22 MiG-23MLs, and 22 MiG-25PD/PDS but noted the last two lacked a true look-down/shoot-down capability and their equipment had 'poor' reliability, while the Iraqis were confident their MiGs could match the American fighters. There were two squadrons with 18 MiG-25s but 20 of the 30 pilots were qualified only for daylight operations, while maintenance problems meant only 10 were usually operational and each squadron could usually deploy only a pair of aircraft. The MiG-29 proved a disappointment for the Iraqis, who would have preferred the Su-27, and accepted only 33 of the 137 MiG-29s ordered. Unknown to Coalition intelligence, these aircraft were modified with French Remora ECM-pods. With a reduced weapon load of two R-27R



(ASCC/NATO-codename AA-10 'Alamo') medium-range missiles and two R-60MK (ASCC/NATO-codename AA-8 'Aphid') short-range air-to-air missiles, and improved ECM dispensers, they could be effective opponents to Coalition fighters, although only half the pilots had qualified in night operations. The 35 MiG-23s had dozens of combat-proven pilots but their avionics proved difficult to maintain and unreliable. However, some were modified to carry the Remora pods and they were armed with the proven and capable R-24 (ASCC/NATO-codename AA-7 'Apex') air-to-air missiles. The Mirages were multi-mission aircraft with a look-down/shoot-down weapon system and could carry Remora pods and advanced ECM munitions dispensers. Although normally equipped with Matra Super 530F-1 medium-range missiles and Matra R.550 Magic Mk.1 short-range missiles they benefitted from 50 Magic Mk. 2 all-aspect missiles captured in Kuwait.<sup>39</sup>

Iraqi Ground Controlled Interception (GCI) saw pilots tightly controlled in numerous exercises during the latter part of 1990. On the night of 25-26 December one of these exercises involved 30 fighters from six bases. The exercises focussed upon training pilots to approach targets in 'total emission control' (EMCON) conditions with sensors and radios turned off, to be activated near the target when pilots were allowed to use their own initiative. This proved impossible with the MiG-25, which was too fast, but other Iraqi interceptors used it. Interestingly, all Iraqi aircraft lost in the air during Desert Storm were not under ground control – either because their communication to the ground control was jammed, or the ground control had been destroyed.

In the four months after the Iraqi invasion the IrAF and the Coalition probed and feinted to test the Iraqi reaction times. As the Coalition built up its aerial armada so did the level of activity, and the Iraqis could not help but be aware that they could not match this effort. In the week ending 30 August the IrAF flew a maximum of 197 sorties on one day while the Coalition flew an average of 74. The following week there was a severe drop in IrAF activity from 173 a day to under 80, while the Coalition flew an average of 91 per day. Coalition activity steadily grew with an average of 123 sorties in the week ending 13 September compared with a daily maximum of 90 from the IrAF, while during the week of 4 October there were a total of some 700 compared with 929 Coalition sorties, and in the following week the figures were some 800 IrAF sorties compared with 780 from the Coalition. As with the Coalition, much of this was training activity augmented by a stream of transport flights into



Assessed as the biggest threat by the Coalition intelligence services, MiG-29 was certainly one of the most modern interceptors in Iraqi service, but not held in as high esteem as the 'Mach 3 capable' MiG-25. (Albert Grandolini Collection)



Although certainly flown by some of the best-trained Iraqi pilots, the IrAF's Mirage-fleet found itself compromised by the French decision to provide wholehearted support to the US-led Coalition – which included provision of the most sensitive intelligence on the F.1EQs and their electronic equipment. As a consequence, the fleet severely underperformed during the war. (Dassault Aviation, via Tom Cooper)

Kuwait by fixed-wing and rotary-wing transports which sometimes accounted for half of the sorties.<sup>40</sup>

CAPs were flown periodically over Kuwait, sometimes using 'buddy' refuelling, while on 16 November AWACS noticed a mission by one of two Ilyushin Il-76MDs modified to carry a French-made Tigre-G radar for testing as an airborne-early warning (AEW) aircraft. On 2 December, another Il-76 passed through Jordanian air space.<sup>41</sup> Poor weather in early January reduced IrAF activity, however this increased again with good weather to 221 sorties on 12 January and 142 the following day. On 15 January only 64 transport flights were noted: by contrast the Coalition flew 1,029 in the week ending 14 January. The IrAF temporarily moved some squadrons into the Kuwaiti bases of Ali as-Salem and Ahmad al-Jaber (respectively referred to as Adnan and Abbas by the IrAF) but concluded that they were too exposed for permanent deployment. The IrAF flew a number of reconnaissance sorties over northern Saudi Arabia in August and in at least two cases IrAF aircraft were turned back by RSAF F-15s while well inside Saudi airspace. There appear to have been no incursions in September but short penetrations did occur in early October and early November with regular reconnaissance sorties along the border being flown from 2 November. The sole Iraqi Boeing 727 electronic reconnaissance (ELINT) aircraft was also involved, and joined five reconnaissance sorties on 28 November, while the IrAF 'eyes' continued to seek signs of ground activity along the border almost daily with two or three sorties a day up until 13 January. Overall, as of 17 January 1991, the IrAF had 620 combat aircraft, 24 Il-76 and An-24 transports, and 243 trainers: the most important amongst these were housed inside 594 hardened aircraft shelters, distributed among more than a dozen

major air bases. Some older combat aircraft were hidden outside air bases, and bigger civilian and military aircraft were evacuated to Jordan and Iran.<sup>42</sup>

### THE AIR OFFENSIVE BEGINS

The Coalition air offensive began at 02:20 on 17 January when US Army AH-64 Apache attack helicopters of 101st Airborne Division, with USAF Special Operations MH-53J Pave Low II combat search and rescue helicopters acting as pathfinders, crossed the border with southwestern Iraq. They attacked a radar site 18 minutes later, wrecking the site with Hellfire missiles, Hydra unguided rockets and 30mm cannon and allowing F-15E Eagles to make a surprise attack upon a suspected Scud site. Orders to Iraqi forces in the field to maintain radio silence reportedly prevented news of the attack reaching Baghdad but at 02:30 ADOC reported 'enemy planes violated our airspace'.<sup>43</sup>

Aircraft crossing the frontier included F-117 Nighthawks carrying 2,000lb (907kg) laser-guided bombs which headed for central Baghdad and the key Kari sites.<sup>44</sup> At 02:51 they opened the gates to Baghdad by hitting the Nukhayb IOC, which was fortunate as the EF-111 Ravens which should have covered them were late. The Nighthawks hit the Kari, C2 (command and control) and industrial sites, with a strike on the AT & T Building abruptly ending CNN's news report mid-way. Although the Nighthawks constituted only 2.5% of the attack aircraft force, in the first 24 hours they accounted for 31% of the strategic missions and during the war would attack 40% of Iraqi strategic targets. This activity earned them the Saudi nickname Ghost (Shaba).<sup>45</sup>

Beneath them the first of 116 shipborne Tomahawk missiles launched in the first 24 hours began arriving. Their terrain-following guidance systems allowing them to approach at heights of 30.5 metres (100 feet) and make sharp turns in their terminal phase. The first was launched at midnight by the cruiser USS *San Jacinto* (CG-56), and other surface-ship and submarine-based missiles struck

ministries, factories and power stations. All were Tactical Land-Attack Missiles (TLAM) versions, the majority were RGM (surface ship launched) or UGM-109C (submarine launched) TLAM-Cs each with a 454 kilogramme warhead, augmented by RGM/UGM-109D TLAM-Ds with 166 1.54 kilogramme bomblets. Of 299 Tomahawks launched by 1 February, 284 were successful, including 27 TLAM-Ds.<sup>46</sup> During the early morning seven SAC B-52G Stratofortresses, flying a 35-hour, 22,500 kilometre return mission from Barksdale AFB, launched 35 AGM-86C Air-Launched Cruise Missiles (ALCMs) with 1,000lb blast-fragmentation warheads and Global Positioning System (GPS) guidance. At least 31 hit their targets.<sup>47</sup>

With Kari disrupted, the full weight of Coalition air power was unleashed by 578 land-based aircraft and 90 carrier-based aircraft. The 'gorillas' conducting these missions were A-10 Thunderbolts (nicknamed the Warthog), F-16C/D Fighting Falcons, F-15E Eagles, F/A-18A/C and CF-18 Hornets, F-111F Aardvarks, A-6E Intruders, Tornados, Jaguars and Mirages, as well as B-52 Stratofortresses, while above them F-15C Eagles flew air superiority sweeps.<sup>48</sup>



Screengrab from a combat camera video showing an AH-64 in action against the Iraqi early warning radar site outside an-Nukhayd, in southern central Iraq, in the first minutes of Operation Desert Storm. (US DoD)



The US Navy was actually the first Coalition service to fire a shot at Iraq, when, at 01:30hrs (Iraqi time) on 17 January 1991, the cruiser USS *San Jacinto* (CG-56) launched the first BGM-109 Tomahawk Land Attack Missile (TLAM) from the Red Sea. Over the following hour, a total of 48 TLAMs were launched by the cruiser USS *Bunker Hill* (CG-52), destroyers USS *Leftwich* (DD-984), USS *Fife* (DD-991), and USS *Paul F Foster* (DD-964), followed by the battleships USS *Missouri* (BB-63) and USS *Wisconsin* (BB-64). This photograph shows a TLAM ascending from USS *Missouri*, early in Desert Storm. (US Navy Photo)





MH-53J Pave Low II helicopters of Task Force Normandy seen while underway to the border with Iraq leading AH-64 Apache attack helicopters of the US Army. (US DoD)

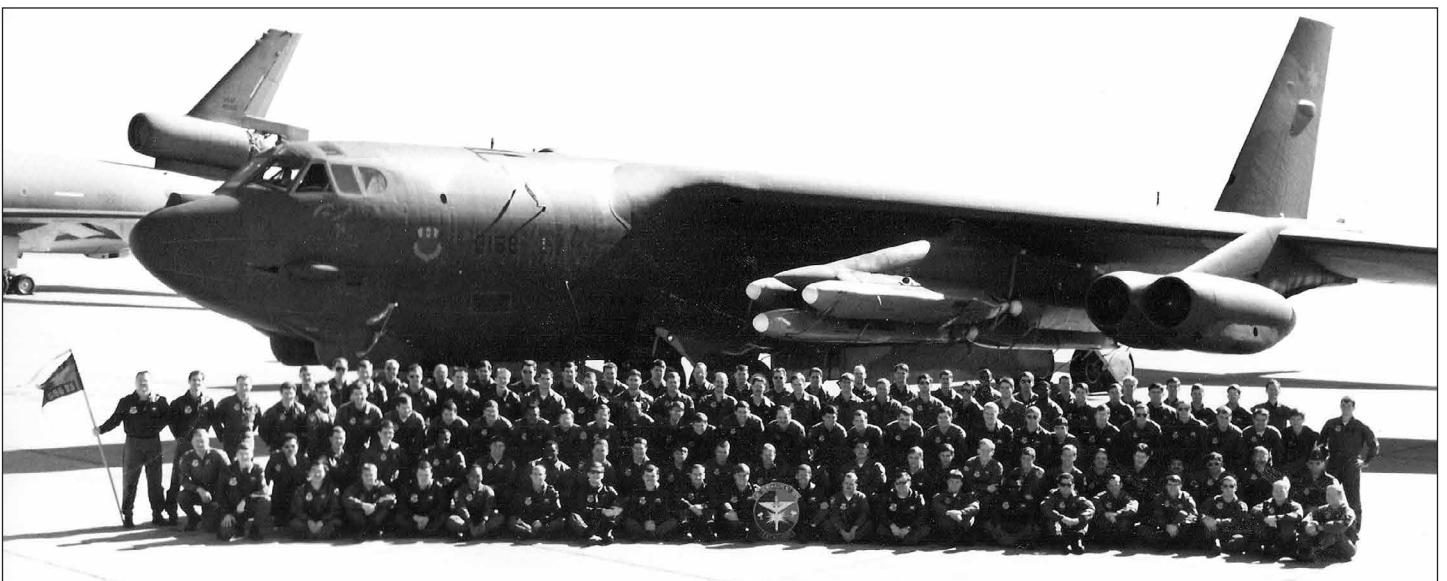
Most strike aircraft carried 907 kilogramme 'dumb' or freefall bombs although on the first night a Special Operations MC-130E Combat Talon dropped eleven 6.8 tonne (15,000lb) BLU-82 fuel/air explosive bombs on minefields and troop concentrations, though seven failed to detonate. There were high hopes for precision attacks using laser-guided 'smart' bombs but only 229 aircraft had laser-designation systems, including Nighthawks, F-111F Aardvarks and Navy Intruders, while the F-15E force had only half-a-dozen LANTIRN designator pods which were rotated around the aircraft. The RAF initially depended upon Buccaneers to designate targets for the Tornado force but on 10 February the first Thermal Imaging and Laser Designation (TIALD) systems for the latter were delivered, and subsequently the type deployed a large number of laser-guided bombs.

The threat from ground fire meant that Coalition air commanders concluded that operating at medium altitude (3,050 metres or 10,000 feet) provided greater security and only the British and Saudi Tornados operated at low level, especially in airfield attack missions using JP233 sub-munition dispensers. Although not directly related

jammer aircraft such as EF-111 Ravens and EA-6B Prowlers, as well as EC-130 Compass Call communications jammers. The US Navy gave SEAD support higher priority than the USAF and sometimes provided almost a 1:1 ratio of strike and SEAD aircraft, and if no Prowlers were available Navy strike missions were rarely flown. When Weasels detected a radar, they launched HARMs to destroy the transmission module, although this was hazardous and one F-4 crew dodged five SA-2 'Guidelines' to destroy a Fan Song radar. HARM, of which 661 were launched, required dedicated aircraft but during the campaign the British modified nine Tornado GR.1s to operate the autonomous Air-Launched Anti-Radiation Missile (ALARM), of which 123 were expended. The first 24 hours also saw drones used to support operations, especially against Baghdad, including the USAF's BQM-74 Chukar III Scathe Mean and US Navy's ADM-141 Tactical Air Launched Decoy (TALD). The Chukars were launched from DC-130 Directors either to create diversions or to support the strike packages, and on one occasion when Iraqi radars illuminated one drone formation more than 200 HARMs were launched.<sup>49</sup> Iraqi radar operators quickly proved

to such low-altitude operations, a growing number of losses eventually contributed to the decision to deploy the Tornados in medium-altitude bombing instead, from 24 January. This, in turn, severely reduced their accuracy, as the jets were custom-tailored for operations from low altitudes, but now had to primarily deploy general purpose bombs from unusual altitudes.

Much of the success of the campaign depended upon SEAD missions by F-4G Wild Weasels and F/A-18 Hornets with AGM-88 High Speed Anti Radiation Missile (HARM) with support from radar



Unknown to the public, seven B-52Gs of the Barksdale-based 2nd Bomber Wing fired the first shots of the war against Iraq: in the course of Operation Secret Squirrel, they released 39 AGM-86C Conventional Air-Launched Cruise Missiles from a point over Saudi Arabia, about 60 miles south of the Iraqi border, at around 02.20 Baghdad time. Three missiles failed to separate and one malfunctioned on launch, but either 31 or 33 of 35 that were launched did strike their targets. This photograph shows one of 2nd BW's B-52Gs loaded with AGM-86Cs. (US DoD)



The 366th TFW-operated Grumman EF-111As were the principal electronic-support aircraft of the USAF. Several of them were amongst the first Coalition aircraft to enter Iraqi airspace immediately after Task Force Normandy destroyed the early warning radar site outside Nukhayd. The threat to EF-111As is demonstrated by the fact that one was almost intercepted by an Iraqi Mirage F.1, and two others came under attack from a MiG-25 interceptor. (US DoD)



The principal task of the EF-111As in the first minutes of the war was to provide electronic warfare support for several formations of McDonnell-Douglas F-15E Strike Eagles, which went after selected targets in western central Iraq. The Strike Eagle had barely entered service before Operation Desert Shield, and while originally planned to replace F-111E/Fs, they still lacked much of their night and precision-strike capability. (US DoD)

reluctant to use their sensors for fear of retaliation and it has been claimed that without this support half of the attacking wave would have been lost. The USAF commented: "In almost every respect, the first night's work represented an enormous success."<sup>50</sup>

During the war, the Coalition lost only 39 fixed-wing aircraft to enemy action, of which about a third were to SAMs, usually 'Grail' MANPADs.<sup>51</sup> Horner had anticipated losing 20-25 aircraft in the first 24 hours but lost only six, with 13 damaged. The only aircraft lost on the first night was a US Navy SEAD F/A-18 shot down by a MiG-25 in what is claimed to be the only Iraf kill.

During the campaign airmen flew long missions, sometimes up to five hours, with most flights requiring airborne refuelling before approaching and departing the target. Horner established a series of tanker tracks across northern and central Saudi Arabia to pick up Coalition aircraft after take-off and accompany them just short of Iraqi air space. These north-south flights were augmented by British east-west flights to support their Tornados. Each tanker track had somewhere between five and eight tankers which would be stacked above and behind the leader, offset to the right, with one mile (1.6 kilometres) between each, and 150 metres (500 feet) higher in altitude. Overall, the tankers flew 15,434 sorties and refuelled 45,955 aircraft with 1.55 million tonnes of fuel.<sup>52</sup>

The air campaign would involve 117,975 sorties, including combat, support and airlift (including 800 civil) sorties, excluding

training and utility.<sup>53</sup> Of this total; 48,734 were offensive sorties; 12,905 were defensive; and 4,923 were offensive support through visual or electronic reconnaissance.<sup>54</sup> Offensive operations included those identified as Strategic (which included industrial and government targets), Offensive Counter-Air, and Tactical/Operational (which involved indirect and direct attacks upon enemy forces), and Escort which included SEAD.<sup>55</sup> This involved the delivery of 89,900 tonnes of bombs, of which American airmen delivered 84,200 tonnes – including

76,800 tonnes of 'dumb' ordnance.<sup>56</sup>

The first day had gone extremely well with Iraqi command arrangements disrupted. While there would be considerable success eroding Iraqi command and control in the future, the second day saw clouds – both literal and figurative – blighting the whole air campaign for the next few weeks. The Iraqi weather was the worst for 14 years – and twice as bad as had been anticipated – as a series of meteorological lows swept through the region producing weather more like a rainy European summer than the anticipated clear desert skies. For 31 out of 43 days cloud cover exceeded 25% at 10,000 ft over central Iraq, exceeded 50% on 21 of those days, and 75% on nine days. The Euphrates valley was often covered by dense mist or fog, at one point for five days in a row, yet each day could see both good and bad weather further disrupting operations. Strong winds and downpours played havoc with targeting and bomb damage assessment and up to half of the sorties were affected by the weather either through abandonment or diversion. The USAF alone cancelled 3,154 sorties while another 2,280 were aborted.<sup>57</sup> The weather also made it difficult to observe rules of engagement which demanded visual identification of targets before weapon release in order to reduce the risk of collateral damage. The worse effected USAF aircraft being the F-117, with 66% of missions failing on the night of 18-19 January. Attacks often had to be made through breaks in the cloud or by using inaccurate radar bombing.





After F-117As, F-111Fs of the 48th TFW (forward deployed at Taif in Saudi Arabia), proved the most important tactical fighter-bombers of the campaign, and were the primary deliverers of precision-guided ammunition. Using laser-guided bombs, they not only destroyed most of the Iraf's hardened aircraft shelters but knocked out hundreds of Iraqi tanks and other heavy vehicles. (US DoD)



The principal HARM-shooter of the USAF during Operation Desert Storm was the venerable F-4G Phantom II – a dedicated 'Wild Weasel' variant, custom-tailored for the task of searching for and destroying enemy air defences, developed during the Vietnam War and continuously updated ever since. The tail-code WW identifies this example as one from the 35th TFW home-based at George Air Force Base in California. (US DoD)

The weather exacerbated difficulties in conducting Bomb Damage Assessment (BDA). Horner and Glosson had anticipated that there would be problems, but not the scale, and often 'gun camera' video became the means of last resort when traditional means of reconnaissance failed. The lack of information, and difficulties distributing what was available, made planning operations in the following days difficult and would cause disputes between the services, yet the second day saw larger packages with strong SEAD support including Chukar drones, but the weather deteriorated so badly by the evening that no Nighthawks were able to strike their primary targets or many alternate ones, while 200 fewer sorties were flown compared with the previous day.

Knowing no plan survives contact with the enemy, the Black Hole plans were for only for the first two days of the air campaign, with an outline plan for the third. The routine now involved producing a Master Attack Plan which took a day to prepare detailed instructions for each mission.<sup>58</sup> But the complexity of the task, especially BDA problems, meant that the 19 January Master Attack Plan was completed only at 20:00 on 18 January. Eventually Horner's Operations Chief, Major General John Corder, simply ordered the planners to give the TACC whatever data they had, with the situation recovering only six days after the campaign began. The planning problems were aggravated by the weather, and co-ordination failures between combat and support aircraft leading to 50 missions being cancelled on 17-18 January rocketed to 456 on 19 January before

dropping to 331 on 22 January then, as the planners adjusted to the situation, it dropped to 105 on 23 January and 31 the following day. However, weather continued to disrupt the offensive.

The aerial offensive had four objectives; controlling the skies of Iraq and the KTO; strategic attacks upon industrial, utility, command/control and Nuclear Biological and Chemical warfare targets; the hunt for Scud missiles; and the offensive against ground forces in the KTO. The Scud hunt, which will be examined in a later chapter, was driven more by political concerns and was largely a wasteful diversion of effort, but the others played a significant role in Desert Storm.<sup>59</sup>

### CONTROLLING IRAQ'S SKIES

The importance of wrecking the Kari IADS is shown by the fact that on the first night 55 sites were attacked, and while all the SOC's were hit and put out of action, the system was not completely destroyed.<sup>60</sup> Surviving equipment from the SOC's was transferred to

alternate sites while technicians expanded local communications systems and used the wire-based network linking observer posts with radars to provide early warning of the presence of Coalition aircraft. The radars were then used in 15-second bursts as height-finders, mainly for anti-aircraft guns, but also to support SAMs which were fired ballistically, relying on their internal sensors to find targets. SAM-system radar-use dropped by 90% and gradually Coalition SEAD assets began to focus upon supporting the assault on ground forces. Offensive Counter Air (OCA) attacks dropped in numbers from 1,428 in Week 1, comprising nearly 21% of offensive sorties to 238 in Week 4, rising again to 512 in Week 6, but the percentage of offensive sorties during the second half of the air campaign was under 5%.

Curiously, Saddam's immediate response was to demand the Iraf did not 'overreact' and expend their strength before the ground war began and demanded that his AAA batteries maintain fire discipline to conserve ammunition, an order repeated on 21 January to ensure his forces could fight a prolonged battle.<sup>61</sup> Some Iraqi fighters rose to engage the Coalition air armada, flying 120 sorties on the first night, but Coalition AWACS vectored fighters onto many. Eight Iraqi aircraft were claimed as shot down, forcing the survivors to their western airfields which briefly retained an effective missile shield. A hundred sorties per night were flown on the next two nights, while on 19 January Eagles of 33rd TFW claimed six aircraft (two each of MiG-29s, MiG-25s and Mirage F-1s) with air-to-air missiles, with





A photograph symbolic for both the aerial component of Operation Desert Storm and the US Navy's participation: the availability of about 200 KC-10A and KC-135 tankers of the USAF, and similar platforms of the RAF and other air forces, made the entire enterprise possible. Without tanker aircraft, next to none of the Coalition aircraft could reach targets deeper inside Iraq. As well as the tankers, EA-6B Prowler electronic warfare aircraft played a crucial role in nearly every air strike conducted by the US Navy. (US DoD)



On 24 January 1991, the USAF initiated a campaign to destroy the IrAF on its bases. This photograph shows one of 245 hardened aircraft shelters on air bases in Iraq and Kuwait targeted by laser-guided bombs deployed by F-111Fs of the 48th TFW, USAF. (USAF)

the Iraqi pilots usually failing to fly evasive manoeuvres. After this, Coalition air-to-air kills virtually ceased with the Iraqis fleeing at the first sign of Coalition aircraft.<sup>62</sup> By the second week of the campaign Coalition tankers were able to cross the Iraqi frontier to refuel US Nighthawks.

IrAF Mirages staged the sole Iraqi offensive mission, on 24 January. Delayed by a day due to Coalition air strikes, this targeted the oil refinery in Ras Tanura and an oil-pumping station in al-Abaqiq, both on the coast of the Persian Gulf. The formation tasked with striking Ras Tanura aborted due to mechanical failures on its tankers, while the two Mirages tasked with attacking Abaqiq entered the Persian Gulf and proceeded to 70km south of Kuwait before both were intercepted and shot down by a division of Saudi F-15Cs.<sup>63</sup> On 15 January, 15 Su-24s were prepared for an air strike on Israel, but the operation was cancelled the following day and the aircraft eventually flown out to Iran.<sup>64</sup>

Unable to force the IrAF to fight in the air and fearing it might still launch an all-out air assault, Horner and Glosson decided to attack its bases and especially their HASs. The conventional view had been that the best way to neutralise enemy air forces was to strike their runways and from the first day RAF and RSAF Tornados, covered by Eagles and Tomcats, made low level attacks without loss using JP233 submunition dispensers and encountering only heavy gunfire. Initially they struck forward bases which might threaten AWACS and tanker aircraft but then they moved deeper into Iraq. They were assisted by B-52 strikes (with aircraft all older than their crews), which approached the KTO at 122 metres (400 feet) before climbing to deliver a rain of 'dumb' bombs. The Tornado attacks had little success and exposed the aircraft to AAA and MANPADs, which shot down

two British and Saudi aircraft on 19 January forcing them to switch to medium-altitude missions.

From 21 January the Coalition switched to precision attacks against hardened aircraft shelters at Iraqi air bases, using 907kg laser-guided bombs released by F-111F Aardvarks and F-117 Nighthawks. These missions would account for nearly half (48%) of Aardvark and a quarter (26%) of Nighthawk sorties to destroy 63% of the shelters, causing the destruction of 209 Iraqi combat aircraft (33% of the total IrAF loss), and damage to 72 others.<sup>65</sup> While it was always planned to hit the main bases, the bad weather meant that secondary bases in southern Iraq bore the brunt of the initial attacks before the Coalition began moving north. By late January not only were Iraqi air operations paralysed but also it was difficult to move men, material and even food between the facilities, or even within them.

On 26 January Saddam decided to implement an agreement he had reached with the Iranians in August 1990, to provide a sanctuary for the IrAF. He made the decision because of the Coalition's air superiority and the limited effect the IrAF had had upon the enemy air campaign adding: "For safekeeping the planes were sent to Iran until the appropriate time comes to use them against the enemy." The operation was a triumph of hope over experience but initially 18 Mirages, nine Sukhois and a Falcon 50 executive transport were despatched, followed over the next three weeks by another 109 aircraft, including a former Iranian Boeing 727 and several Kuwaiti airliners. A dozen were lost to enemy action and accidents, but 102 combat aircraft crossed the border and the Iranians apparently decided to use this manna to strengthen their own air power: therefore, not one was ever returned to Iraq. The move surprised the Coalition which established CAP barriers over eastern Iraq, claiming three victories on 6 February, but proved unable to prevent most aircraft from reaching the dubious sanctuary. Iraqi air power was left with unserviceable fixed-wing IrAF aircraft, often kilometres

outside the bases, and IrAAC helicopters which were constantly on the move during the rest of the war.<sup>66</sup>

With the departure of the IrAF, the SAM and gun battalions had to face constant attacks in an electronic warfare environment which made using their radars hazardous. Batteries were moved around to shore-up defences around key sites, but they were still ordered to conserve ammunition. While repositioning was vital for survival this was hampered by a lack of towing vehicles. Many batteries, which the Coalition had located, lost men and weapons and those defending the Project 777 nuclear site suffered 294 casualties, including 149 dead. As early as 19 January, Saddam ordered batteries south to support the troops in the KTO but after the war would bitterly complain the Soviet Union had not provided its best SAM systems. According to Iraqi sources, 98% of SA-2s, 88% of SA-6s, and 46% of SA-3s SAM systems were destroyed; furthermore, over 200 surveillance radars were hit, of which 120 were destroyed.<sup>67</sup>

## THE STRATEGIC CAMPAIGN

While the Coalition secured the skies over Iraq the strategic campaign continued relying increasingly upon manned aircraft. Missions were flown in 'packages' which consist of Falcons from al-Dhafra and al-Minhad, Eagle air superiority fighters from al-Kharj, Wild Weasels from Shaikh Isa, and Raven jammers from Taif, and they might also be supported by Navy/Marine SEAD aircraft such as Prowlers and Hornets. The largest mission of the war, Packet Q against Baghdad on the afternoon of 19 January, consisted of 72 Falcons of 388th and 401st TFW, eight Eagles, eight F-4G Wild Weasels and two Ravens with distant support from AWACS, C-130 ABCCC (Airborne Battlefield Command and Control Centers), Compass Call EC-130s and Rivet Joint RC-135s. The packet would assemble at the southern end of the tanker tracks, refuel, and then move across the frontier. Packet Q was cursed by sudden re-targeting which forced unsupported Falcons to fly through air defences because the Wild Weasels had refuelling problems, as did some of the strike force. A shower of 20 SAMs was launched and shot down two Falcons and as the formation departed it was briefly pursued by a pair of MiG-29s until the CAP shooed them away.

Following this mission manned aircraft ceased daylight raids upon central Iraq, this role being assigned to the Tomahawks, but their light warhead meant they were useful only against 'soft' targets such as buildings. Although the

Navy still had some 200 TLAMs available Schwarzkopf refused to approve their use in February. Night missions continued usually using Nighthawks and F-111F Aardvarks but the while the former remained the backbone of the strategic campaign, hitting 1,600 targets with a 40-60% success rate, they were vulnerable to bad weather.

The paradox of the Coalition air campaign is that while much planning effort was expended upon strategic targets, operations were overwhelmingly at the tactical-operational level. Between Weeks 1-3 the percentage of strategic to total offensive sorties dropped from 12% to 5.5% from 26 January. Horner gave increasing priority to the erosion of Iraqi ground strength while maintaining pressure upon C2 and NBC facilities which was echoed by Schwarzkopf's directive the following day. Even the Nighthawks would be diverted to this role which accounted for 5% of their missions during Week 4. However, because poor weather reduced overall activity during Weeks 4 and 5, strategic operations accounted for between 10% and 15% of overall offensive sorties and then dropped to 4% in the last week.

Leadership targets accounted for 14% of missions in Week 4, to include Saddam's opulent palaces and even his fleet of mobile homes, while command/control accounted for 20% and the latter led to tragedy. Intelligence had identified 25 bunkers which might be used for command/control. Of these, 15 were regarded

**TABLE 6: WEEK 1 (17-23 JANUARY)**

Mission	United States			Allied		Total
	USAF	Navy	Marines	NATO	Arab	
Strategic	1,749	74	184	245	26	2,278
Tactical/Operational	2,096	340	427	111	162	3,136
Escort	809	470	83	8	22	1,392
Reconnaissance	94	92	-	8	4	198
Electronic warfare	283	54	60	12	-	409
Defensive	813	711	14	369	473	2,380

**TABLE 7: WEEK 2 (24-30 JANUARY)**

MISSION	UNITED STATES			ALLIED		TOTAL
	USAF	Navy	Marines	NATO	Arab	
Strategic	1,085	92	-	132	30	1,339
Tactical/Operational	3,041	380	1,104	250	347	5,122
Escort	786	274	138	60	40	1,298
Reconnaissance	126	251	2	24	12	415
Electronic warfare	263	50	26	13	-	352
Defensive	832	708	-	252	440	2,232

**TABLE 8: WEEK 3 (31 JANUARY-6 FEBRUARY)**

MISSION	UNITED STATES			ALLIED		TOTAL
	USAF	Navy	Marines	NATO	Arab	
Strategic	826	109	-	106	47	1,088
Tactical/Operational	4,158	672	1,233	385	452	6,900
Escort	640	221	140	69	31	1,101
Reconnaissance	187	242	1	18	30	478
Electronic warfare	263	51	31	14	-	359
Defensive	773	649	-	280	459	2,161

TABLE 9: WEEK 4 (7-13 FEBRUARY)						
MISSION	UNITED STATES			ALLIED		TOTAL
	USAF	Navy	Marines	NATO	Arab	
Strategic	876	162	-	187	16	1,241
Tactical/Operational	4,318	632	1,540	324	466	7,280
Escort	613	195	33	56	21	918
Reconnaissance	155	174	-	43	20	392
Electronic warfare	228	27	64	14	-	333
Defensive	626	594	-	282	457	1,959

TABLE 10: WEEK 5 (14-20 FEBRUARY)						
MISSION	UNITED STATES			ALLIED		TOTAL
	USAF	Navy	Marines	NATO	Arab	
Strategic	626	121	-	112	30	889
Tactical/Operational	517	10	1,292	180	518	2,517
Escort	575	318	79	67	20	1,059
Reconnaissance	325	181	-	65	28	599
Electronic warfare	237	32	56	14	-	339
Defensive	648	634	-	238	359	1,879

TABLE 11: WEEK 6 (21-28 FEBRUARY)						
MISSION	UNITED STATES			ALLIED		TOTAL
	USAF	Navy	Marines	NATO	Arab	
Strategic	591	10	-	392	-	993
Tactical/Operational	4,591	1,494	2,415	249	595	9,344
Escort	508	272	-	55	4	839
Reconnaissance	350	180	-	57	24	611
Electronic warfare	274	46	105	13	-	438
Defensive	824	847	-	270	353	2,294



Organising and running Operation Desert Storm was a giant exercise in management and logistics – and there are few photographs demonstrating this as clearly as this one, showing no fewer than 28 F-16Cs of the 363rd TFW in the process of in-flight refuelling from five KC-135 tankers, while underway to Iraq. (US DoD)

as active including one at the al-Firdos, where electronic communication installations were detected, possibly civilian wireless telephones. In fact, it was being used in early February as a civilian air-raided shelter apparently for Ba'ath Party members and their families. Consequently, when two Nighthawks each dropped a bomb on the bunker during the night of 12-13 February, 200-400 civilians were killed. A British Tornado had previously caused heavy civilian casualties during an attack upon a bridge across the Euphrates at Nasiriyah. The political fall-out meant that Schwarzkopf now had to approve all targets in Baghdad and the strategic campaign virtually ended on 9 February.

Sporadic attacks were conducted by Nighthawks during late February and their ability to strike hardened targets was boosted at the very end of the campaign when four hurriedly-developed 2.2 ton (5,000lb) bombs – their bodies made from gun barrels – were flown to Saudi Arabia and successfully used on the last night of the air offensive against a command bunker at North Taji, 30 kilometres from the Taji SOC. As the war was drawing to a close, Schwarzkopf ordered Horner to plan a 72-hour campaign to destroy Iraq's remaining NBC capability if a cease-fire was imminent. The weather hamstrung this campaign but Nighthawks hit the prime nuclear site at Tuwaitha on 18, 19 and 23 February while on the night of 27-28 February they returned to Baghdad and hit the Ba'ath Party headquarters.

The strategic campaign from Saudi Arabia largely involved precision strikes, while those from Turkey and beyond into northern Iraq involved mostly 'dumb' bombs which limited its effectiveness. Jamerson's Joint Task Force Proven Force began attacks on 18 January and relied upon F-111E





From the end of January 1991, Horner assigned the RAF to bridge-busting missions. Usually four Tornados, each carrying three 1,000lb LGBs, would launch them in salvos. Because they launched more LGBs than anyone, else the RAF destroyed 63% of the bridges they attacked in Iraq and Kuwait. This photograph shows an LGB-armed Tornado, together with a Victor K.Mk 2 tanker of 55 Squadron, RAF.<sup>69</sup> (Mark Lepko Collection)



Saudi Tornado IDSs also took part in Operation Desert Storm – even if at a much smaller scale than might have been expected from the number of available airframes alone. However, as of 1990-1991, the RSAF was still a long way from becoming a combat-efficient air force. This pair of Tornados from No. 7 Squadron was photographed while refuelling from a KC-130 Hercules of No. 16 Squadron. (Mark Lepko Collection)

Aardvarks and Falcons, supported by a small SEAD force and EW aircraft including Greek-based RC-135s, and augmented by B-52s from European bases. BDA was hampered by the lack of photo-reconnaissance aircraft until the arrival on 6 February of six RF-4Cs. Jamerson focussed upon oil and industrial targets in northern Iraq and towards the end of the war he received a potential precision strike force of F-4Es from Clark AB, Philippines. However, they arrived without their laser designator pods and the only 'precision' capability was the expenditure of 55 Mavericks against industrial targets. Although focussing upon northern Iraq, Jamerson gradually crept south of the 35th Parallel into central Iraq to within 15 miles of Baghdad in the last fortnight of the air campaign, as did the British-based B-52s which flew 70 sorties during this period.

Saddam's complacency about the strategic campaign was collapsing as early as 19 January due to its significant impact upon national communications. The communications went into decline within the first five minutes as telephone exchanges, microwave towers and cable nodes were destroyed or cut, followed by the

electrical generation system. Saddam demanded radio silence and severe reductions in wireless communications and did not lift the restriction until 2 March. Important communication had to be through hand-written letters.

The campaign destroyed 11 of 20 major power stations and damaged six. Also destroyed were 119 sub-stations, while 28 oil facility targets attracted 1,200 tonnes of bombs. All the major NBC facilities were badly damaged, although not destroyed. Despite Coalition attempts to avert civilian casualties there were 8,243 of these, including 2,278 killed.<sup>68</sup>

### IRAQI TROOPS UNDER THE BOMB

In planning the ground offensive Schwarzkopf and his staff decided air power would halve Iraqi ground forces' strength, almost echoing the views of air power prophet Giulio Douhet. This was the first time that airmen had been given the task of preparing the battlefield and it was surprising not only that Schwarzkopf requested it but also that Horner and the airmen did not object.<sup>70</sup> They calculated that even if a quarter of the sorties failed to find their targets they could achieve this objective within 23 days of good weather, even excluding operations by Thunderbolts, USMC Harriers

and B-52s. They would first target the Guards for four or five days, and then the Army with 600 sorties a day using AGM-65 Maverick anti-armour missiles and 454-kilogramme (1,000 lb) CBU-89 Gator anti-armour and anti-personnel cluster munitions. However, these conclusions were assessed as, 'dangerously optimistic'.<sup>71</sup> The problem was that the Black Hole had focussed upon the strategic element until December and although they were expanded with 9th Air Force staff to plan operations within the KTO, there was no experience in this kind of planning, which was, essentially, run along the 'bombed from the map' principle, using a statistical approach which assigned a specific number of sorties which it was assumed would ensure success.

While the air campaign's first day's focus was upon strategic operations, Thunderbolts and Falcons were also active pounding the Guards and joined in the evening by seven B-52s, while Harriers and Hornets struck targets to the south.<sup>72</sup> On the first day the USAF and US Marines flew 427 interdiction and 98 Close Air Support (CAS) sorties, the strategic campaign hit GHQ's forward

headquarters in Basra forcing the staff to move to a fully equipped, pre-prepared alternative location.

The KTO was divided into square 'kill boxes' with each side 48.25 kilometres (30 miles) long and covering 2,331 square kilometres (900 square miles) sub-divided into four quadrants. Schwarzkopf insisted upon striking the Guards, who were regarded by Washington as a key element supporting the Iraqi government. However, he failed to communicate his priorities to his Army and Marine subordinates who blamed Horner when their targeting recommendations seemed to be ignored, with only 15% of 2,000 nominated targets hit. The Marines joined the persecution of the Guards, who were the prime target for the first three days, but progress was too slow for Schwarzkopf who on 27 January demanded an intensification of the campaign within the KTO. Unfortunately, he interfered with the KTO air campaign by ignoring the air planning system and informing Horner and Glosson which targets he wanted attacked.

There were two significant problems; the need to avoid air defences and to conduct BDA. To shield the KTO, the Iraqi Army provided SA-6 batteries, nine of which protected the Guards, augmented by 13 self-propelled Roland 1 clear weather systems and static Roland 1 and 2 systems (which usually served to protect SA-6s). Four Roland batteries defended Kuwaiti air bases and the Mutlaa Ridge where the ex-Kuwaiti MIM-23B I-HAWK battery remained operational. Each corps had at least three SA-6 'Gainful' batteries and gun battalions with eighteen 57mm S-60s, while each division nominally had one or two gun battalions with nine ZSU-23-4 self-propelled quad 23mm guns or 18 towed 23mm, 37mm or 57mm guns, as well as 9K31 Strela-1 (ASCC/NATO-codename SA-9 'Gaskin') or 9K35 Strela-10 (ASCC/NATO-codename SA-13 'Gopher') missile battalions with nine launchers. There were also some 20 batteries with 3,000 9K32 Strela-2 (ASCC/NATO-codename SA-7 'Grail') and 9K34 Strela-3 (ASCC/NATO-codename SA-14 'Gremlin') man-portable surface-to-air missile systems (MANPADS). There were 75 army air defence gun battalions (1,350 guns), of which 39 had radar fire control, many shielding airfields, while the 36 without radar supported the ground forces. One source claims that there were 100 AAA sites with 124 guns in Kuwait, 167 with 667 guns around Basra and 73 with 180 guns along the northern edge of the KTO.<sup>73</sup>

SEAD forces soon restricted the SAM threat, except for that from 'Grails', with the scale of support higher over the KTO than for missions into central Iraq, with almost one for every strike aircraft, but guns remained a serious threat. Medium altitude attacks, while reducing losses and boosting both military and political morale, reduced accuracy against targets such as AFVs dispersed into revetments and covered with camouflage netting or sandbags. The problem was so severe for Thunderbolts that on 31 January they were permitted to attack from 4,000-7000 feet and immediately became more effective, while during the next fortnight only one aircraft was shot down and six damaged. But on 15 February the Guards launched eight 'Grails' which shot down two aircraft and badly damaged a third, and Horner now confined Thunderbolt operations to within 37 kilometres of the frontier. They were replaced by Falcons but their 'dumb' bombs and those of the Hornets usually missed targets, even when using radar, while the percentage of targets obscured by clouds rising from 2% to 33% and wind speeds of more than 100 knots also effected accuracy.

Horner's planners were unaware that few Falcon crews were familiar with the Maverick, with only 130 sorties launching them compared with 8,700 which dropped 'dumb' bombs, with many submunition fuses failing. Similar problems were suffered by other Coalition strike aircraft while the over optimistic reports by Horner's staff, who lacked the means to objectively assess the effects of the attacks and were apparently not interested in evaluating the results, raised concern among the ground commanders especially as both the CIA and DIA produced more pessimistic assessments. On 12 February, for example, the agencies estimated only 10% of KTO armour had been destroyed while Horner put the figure at 25%. The USAF report admits physical damage was 'questionable' while the emphasis upon statistics meant there was no attempt to assess the impact upon enemy morale, which was considerable as the campaign seemed both relentless and endless.

A new dimension to the offensive appeared in late January as F-111F crews reported that their FLIR sensors could detect AFVs and artillery because the metal cooled at a different rate from the sand. Horner decided to see if this might be useful and on the night of 6-7 February they dropped eight 227kg (500lb) GBU-12 Pavement bombs on revetted positions and were credited with four tanks



B-52G bombers – usually armed with old M117 general-purpose bombs (visible on the right side of this photograph, under the inboard underwing pylon) – flew not only thousands of combat sorties, but also delivered more than 30% of the air-delivered ordnance released during Operation Desert Storm. (US DoD)

and a gun. After a 24-hour pause to assess results, Horner switched the Aardvarks from strategic to battlefield preparation missions and from the night of 8-9 February they began 'tank plinking' attacks, although Schwarzkopf disliked the term. By the campaign's fourth week these attacks took up 73% of their operations (360 sorties) with 6% on oil targets and 5% military support. In the last fortnight only a dozen missions (75 sorties) were flown against strategic targets. As a result of 'plinking', AFV crews ceased living in their vehicles which made them less ready for action.

During the third week, from 2 February, there was a greater emphasis upon the frontier defences, especially by the Marines and Thunderbolts aided by special operations MC-130s dropping 6.8 tonne (15,000 lb) BLU-82 fuel/air bombs. Here, as throughout the KTO, from early February 'fast' forward air controllers (FAC) called 'killer scouts' appeared in Falcons with GPS to assist target recognition, entering each box at designated times to link up with strike aircraft and locate targets. A decline in Iraqi air defence, allowing attacks at lower altitudes, increased effectiveness and by early February strike packages were no longer directly supported by SEAD missions. Instead, both Ravens and Weasels flew orbits ready to jam or hunt down SAM radars.

Sorties flown against the Iraqi ground forces and their defences rose from 1,289 in Week 1 to 2,715 in Week 2 and were then between 4,505 and 4,890 a week to the end of the war. In the final two weeks Coalition air forces sent 68% of all offensive sorties against the Iraqi army in the KTO. On one night Nighthawks struck Kuwaiti pumping stations which could feed oil into trenches whose flames were to thwart Coalition ground attacks. The frontier positions, as well as the Guards, suffered during Week 5 as the KTO campaign reached a peak with fewer attacks in the west of Iraq partly due to the absence of targets and partly to deceive the enemy as preparations were under way for the land campaign. Throughout the campaign Horner sought to target specific Guards divisions and a B-52 attack upon the Adnan division's supply dumps near Basra produced a huge secondary explosion which both the Russians and Israelis thought was a nuclear weapon, the smoke cloud reaching to 25,000ft. The B-52s came not only from Diego Garcia, but also from Moron AB in Spain where the force increased from 10 to 22 by mid-February: they proved especially effective against targets covering a large area.

The interdiction of communications focussed upon bridges into the theatre, most of them cut by early February, but resourceful Iraqi engineers built pontoon bridges and filled in holes with earth-moving equipment. There was neither a coherent or consistent effort to close the roads but most daylight truck traffic ceased soon after the offensive began, although JSTARS provided occasional targets of opportunity. However, vehicle traffic was disrupted, making the distribution of food, water, and ammunition to frontline forces extremely difficult. As a result, the first thing POWs requested was food. By 22 February, intelligence claimed 22 of 43 divisions identified in the KTO were less than 75% effective. Elvene were at less than 50%, including the divisions in front of the US VII Corps.

The physical damage was considerable and of 54 key rail and road bridges supporting the KTO, 41 had been destroyed or damaged, forcing the Iraqis to create 32 pontoon or pipe bridges, and disrupting supplies by up to half. Air defence assets, according to the Iraqis, suffered lightly with the loss of 2% of all guns and 5-7% of Roland systems. Although not specifically targeted, the loss of trucks disrupted the distribution of food, and the 25th Infantry Division resorted to using camel trains to supply its forward troops.

One of the most controversial aspects of the Coalition air campaign was the official BDA claims for damage to Iraqi divisions. This was based on over-estimating Iraqi strength in the KTO which claimed 4,922 tanks and 3,256 guns of which 1,772 and 1,474 respectively were reported 'destroyed.' These figures are now regarded as wildly optimistic and a post-war study suggested no Iraqi armoured or mechanized division was seriously affected by them.<sup>74</sup> The Coalition failed to damage the communication systems connecting the forward headquarters with the corps headquarters due to these being relayed by a coaxial cable that was buried deep in the ground. On the eve of the ground offensive the cumulative effect of the Coalition's air attacks on the Iraqi military was moving well beyond the physical, and even the morale of the Guards' was wavering with considerable desertion problems: the latter were estimated to have reduced the Iraqi strength in the KTO from 336,000 to 220,000.<sup>75</sup>

**TABLE 12: IRAQI ARMY AND THE REPUBLICAN GUARDS FORCES COMMAND ORDER OF BATTLE, JANUARY-MARCH 1991<sup>76</sup>**

CORPS	DIVISION	BRIGADES
<b>Guards</b>	Al-Madina Guards Armoured Division	2nd, 10th Guards Armoured, 14th Guards Mechanized
	Hammurabi Guards Armoured Division	8th, 17th Guards Armoured, 15th Guards Mechanized
	Adnan Guards Mechanized Division	40th Guards Armoured, 38th Guards Mechanized
	Tawakkalna Guards Mechanized Division	9th, 18th Guards Armoured, 29th Guards Mechanized
	al-Faw Guards Infantry Division	24th, 25th, 27th, 28th Guards Infantry
	Baghdad Guards Infantry Division	4th, 5th, 6th, 7th Guards Infantry
	Nebuchadnezzar Guards Infantry Division	19th, 20th, 22nd, 23rd Guards Infantry
	Guards Special Forces Division	3rd, 16th, 26th Guards Special Forces
	Independent	I, II Guards Artillery Brigades
<b>I Corps</b>	al-Qods Guards Infantry Division	35th, 36th, 37th Guards Infantry
	Mustafa Guards Infantry Division	32nd, 33rd, 34th Guards Infantry
	45th Infantry Division	841st, 842nd, 843rd Infantry
	54th Infantry Division	45th, 503rd Infantry
<b>II Corps</b>	Independent	54th Armoured, I Corps Artillery, I Corps Commando Brigade
	17th Armoured Division	59th, 70th Armoured, 99th Mechanized
	51st Mechanized Division	41st Armoured, 31st, 32nd Mechanized
	Independent	II Corps Commando, II Corps Artillery



<b>III Corps</b>	3rd Armoured Division	6th, 12th Armoured, 8th Mechanized
	5th Mechanized Division	26th Armoured, 15th, 20th Mechanized
	7th Infantry Division	19th, 38th, 39th Infantry
	8th Infantry Division	3rd, 22nd, 23rd Infantry
	14th Infantry Division	14th, 18th, 94th Infantry
	18th Infantry Division	95th, 422nd, 704th Infantry
	29th Infantry Division	83rd, 84th, 703rd Infantry
	42nd Infantry Division	451st, 452nd, 844th Infantry
	Independent	III Corps Commando, III Corps Artillery
<b>IV Corps</b>	1st Mechanized Division	34th Armoured, 1st, 27th Mechanized
	6th Armoured Division	16th, 30th Armoured, 25th Mechanized
	2nd Infantry Division	2nd, 4th, 36th Infantry
	16th Infantry Division	108th, 416th, 505th Infantry
	20th Infantry Division	44th, 60th Infantry
	21st Infantry Division	423rd, 430th, 706th Infantry
	30th Infantry Division	53rd, 506th, 705th Infantry
	36th Infantry Division	106th, 602nd Infantry
	Independent	56th Armoured, IV Corps Commando, IV Corps Artillery
<b>VI Corps</b>	19th Infantry Division	82nd, 427th Infantry
	22nd Infantry Division	93rd, 425th, 705th Infantry
	23rd Infantry Division	33rd, 98th, 437th, 604th Infantry
	28th Infantry Division	78th, 412nd, 417th Infantry
	34th Infantry Division	90th, 502nd, 504th Infantry
	37th Infantry Division	114th, 445th, 804th Infantry
	46th Infantry Division	88th, 89th, 426th Infantry
	50th Infantry Division	413rd, 414th, 415th Infantry
	53rd Infantry Division	3rd, 418th, 439th Infantry
	56th Infantry Division	71st, 75th, 449th Infantry
	Independent	51st Armoured, VI Corps Commando Bde, VI Corps Artillery

<b>VII Corps</b>	25th Infantry Division	87th, 91st, 92nd Infantry
	26th Infantry Division	110th, 434th, 806th Infantry
	27th Infantry Division	72nd, 119th Infantry
	31st Infantry Division	49th, 79th, 605th Infantry
	48th Infantry Division	802nd, 803rd, 807th Infantry
	Independent	52nd Armoured, VII Corps Commando, VII Corps Artillery
<b>al-Jihad OpHQ</b>	10th Armoured Division	17th, 24th Armoured, 42nd Mechanized
	12th Armoured Division	37th, 50th Armoured, 46th Mechanized
	Independent	57th Armoured
<b>al-Qali OpHQ</b>	11 Infantry Division	47, 48, 501 Infantry
	15th Infantry Division	76th, 104th, 436th Infantry
	al-Jahra Divisional Headquarters	
	Al-Nida (al-Ahmadi) Divisional Headquarters	
	Independent	55th, 80th Armoured, 65th, 66th, 68th Special Forces, 440th Naval
<b>West Euphrates OpHQ</b>	47th Infantry Division	507th, 508th, 509th Infantry
	49th Infantry Division	86th, 107th, 118th Infantry
<b>OpHQ=Operational Headquarters</b>		

**TABLE 13: COALITION GROUND FORCES ORDER OF BATTLE, JANUARY-MARCH 1991**

<b>3RD US ARMY</b>		
<b>CORPS</b>	<b>DIVISION</b>	<b>BRIGADE</b>
<b>XVIII US</b>	24th Infantry (Mechanized) Division	1st, 2nd Brigades 197th Infantry (Mechanized)
	82nd Airborne Division	1st, 3d Brigades
	101st Air Assault Division	1st, 2nd, 3d Brigades
	French 6th Light Armoured Division	Group East and West 2nd Brigade/82nd Airborne Division
	Corps	3d Armored Cavalry Regiment, 12th, 18th Aviation
	Corps	18th, 196th, 212nd Field Artillery

<b>VII US</b>	1st Armored Division	2nd, 3d Brigades 3d Brigade/3d Infantry Division (Mechanized)
	3d Armored Division	1st, 2nd, 3d Brigades
	1st Infantry (Mechanized) Division	1st, 2nd Brigades 3d Brigade/2nd Armored Division
	1st Cavalry Division	1st, 2nd Brigades
	Corps	2nd Armored Cavalry Regiment 42nd, 75th, 142nd, 210th Field Artillery Brigades
<b>Special Forces Operations Command</b>		3d, 5th Special Forces Groups 160 Aviation Regiment
<b>Army</b>	2nd Infantry (Mechanized) Division	1st, 2nd Brigades
<b>1 Marine Expeditionary Force</b>	1st Marine Division	6th, 8th Marine Regiments (Inf), 10th Marine Regiment (Art)
	2nd Marine Division	1st, 3d, 4th, 7th Marine Regiments (Inf), 11th Marine Regiment (Art)
	Task Force 158	4th, 5th Marine Expeditionary Brigades
	Corps	1st Brigade/2nd US Army Armored Division
	1st (UK) Armoured Division	4th, 7th Armoured
<b>Joint Forces Command North</b>	Saudi/Kuwaiti TF Khalid	20th Saudi Mechanized, 45th Saudi Armoured, 35th Kuwaiti Mechanized, 15th Kuwaiti Infantry
	4th Egyptian Armoured Division	2nd, 3rd Armoured, 54th Mechanized
	3rd Egyptian Mechanized Division	One armoured, two mechanized brigades
	9th Syrian Armoured Division	Two armoured, one mechanised brigade
		45 Syrian Commando
<b>Joint Forces Command East</b>		8th, 10th Saudi Mechanized
		North Oman
		Kuwaiti 'Al Fatah'

## 2

## IRAQ STRIKES BACK: THE MISSILE OFFENSIVE AND THE BATTLE OF AL-KHAFJI

Iraq's invasion then annexation of Kuwait in August 1990 provoked world-wide opposition and led to an American-led Coalition determined to reverse Baghdad's Anschluss. Diplomatic means failed and on 17 February 1991 the Coalition began an air offensive as the first stage of physically driving Iraqi forces out of what they believed was the country's 19th Province.

The rain of bombs and missiles on Iraqi territory and forces was unrelenting as the Iraqi air defence shield was shattered. However, Saddam still possessed the means of retaliation. During the war with Iran, Baghdad had launched numerous ballistic missiles, both Soviet-built Scuds with a 300 kilometre range and their Iraqi derivatives (Al-Hussein) with a 650 kilometre range, and the bombardment played a major role in undermining Iranian morale and forcing them to end the war.

Saddam's ultimate post-war goal was to lead a pan-Arab force which would eliminate 'the Zionist entity' of Israel. From October 1988, two months after the Iran-Iraq war ended, he began expanding his surface-to-surface missile (SSM) force under Brigadier General Hazim Abd al-Razzaq al-Ayyubi, and prepared launch sites in the deserts of al-Anbar Province in western Iraq straddling the highway from Baghdad to Jordan, Iraq's remaining gateway to the world. By April 1990, Ayyubi had the 223 and 224 Missile Brigades, with fixed and mobile launchers, together with command centres, communications and storage facilities all carefully camouflaged and protected by air defence forces, ready to retaliate if the Israelis struck Iraqi military and industrial sites.<sup>1</sup>

Saddam's disinformation campaign emphasising the Israeli threat meant that Ayyubi, who was not informed about the Anschluss, worked on from late July on plans to strike Israeli targets. Considerable emphasis was placed on practicing with the mobile launchers, slashing preparation times to 4 hours, and even with the use of chemical warheads, and ended with the test launch of a Hussein missile on 2 December. In the weeks following the invasion however, Ayyubi was shocked to find he had another set of targets, this time in Saudi Arabia. From 16 August southern operations were under a Missile Control Centre created from 225 Missile Brigade headquarters, which had short-range unguided Luna ballistic missiles and was deployed into Kuwait, but cartographic failures meant planning was with tourist maps.<sup>2</sup> On 9 October Saddam announced that in the event of war he would strike both Israel and Saudi Arabia with long-range missiles and between 2 and 28 December he test-fired a number of missiles, although these helped the Coalition improve missile warning procedures.

### THE MISSILE OFFENSIVE

On 7 January Ayyubi met his brigade commanders and he gave them their final orders. The priorities were Haifa and Tel Aviv in Israel and the US bases at Dhahran, Dammam, al-Jubayl, and Hafir al-Batin in Saudi Arabia whose capital, Riyadh, was a secondary target. Saddam stated that conventional explosive warheads were to be used but he warned Ayyubi on 8 January that 'special weapons' (chemical warheads) from the Muthanna State Establishment might be used. These were to be assembled but only when he received a

**TABLE 14: THE SCUD CAMPAIGN<sup>5</sup>**

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
Scud launches						
West	13	14	2	3	3	4
South	20	4	2	2	7	12
Total	33	18	4	5	10	16
Coalition air sorties	472	275	166	186	184	115

code word over a dedicated radio and telephone network for which he assigned one of his own bodyguards. Saddam had earlier ordered Lieutenant General Amer as-Saadi, head of the Al-Hussein missile development team, to prepare chemical and biological warheads for his missiles.<sup>3</sup>

Within nine hours of the Coalition air campaign beginning Saddam's hand-written order to strike Israel was delivered to Ayyubi by a courier, and that night eight missiles were launched. Further missiles followed as Ayyubi's forces went into a cycle of confirming

launch site to avoid enemy aerial retribution. From the night of 20-21 January missiles were launched against Saudi targets, though with a blanket ban on targets anywhere near the holy cities of Mecca and Medina.<sup>4</sup>

223 Brigade concentrated its attention upon Saudi Arabia, launching only one missile westwards, while 224 Brigade focused upon Israel, although they occasionally exchanged mobile missile launchers or Transport Erector Launchers (TEL). The former's Iraqi-built an-Nida and al-Waleed vehicles proved unreliable compared with the latter's Soviet-built MAZ-543, some modified to take the later Hussain missiles, and which meant slower loading and launching rates. Therefore, many of the attacks upon Israel were launched from 'borrowed', Soviet-made vehicles. Another problem for 224 Brigade was that it was operating in the vicinity of the fixed launcher positions which had been located by the Coalition before hostilities and naturally attracted bombs. The missiles fired westward towards Israel nominally had military targets but poor targeting data and guidance systems meant most fell on empty land, some in Palestinian territory, and including some with concrete-penetrator heads which were aimed at the Dimona nuclear reactor.

Ayyubi began the campaign with 230 missiles and 75 'special warheads' and between 17-28 January launched 52 missiles – an average of four a day – from 11 launch sites. This left him with 178 missiles at the end of the war, of which 34 required maintenance, but sufficient fuel for only 118. He requested 41 new missiles, repairs for another seven, and fuel for a further 60. In response, on 2 February, Saddam ordered a two-day pause to regroup his forces after which the firing rate would be halved to prolong



A deployed MAZ-543 TEL and al-Hussein ballistic missile in the centre-left of the photograph, with support vehicles closest to the camera. (via Ali Tobchi)



A Luna-M/FROG-7 ballistic missile of the 225 SSM Brigade seen getting into position. (via Ali Tobchi)





A damaged and abandoned ASTROS II MRL system. Iraq purchased at least 66 examples of this weapon system from Brazil (and possibly considerably more). The Iraqis were able to fire the 127mm SS-30, 180mm SS-40 and 300mm SS-60 rockets from this vehicle with ranges of 30km, 35km and 60km respectively. (Major Phil Watson)

the campaign. During February, 223 Brigade extended its targets to Bahrain and Qatar but Ayyubi's men were moving launchers and weapons around in a lethal version of 'Find-the-Lady' with the Coalition. Increasingly, the TELs had to be concealed, often in culverts but at least once in a refugee camp. They were hidden so well that post-war United Nations observers failed to find the surviving 19 launchers and 62 missiles. Survival was aided by three deception units with obsolete FROG missiles which aped the real missile brigades' activities.

Saddam believed his missile offensive was having as great an effect upon the Coalition, and especially Israel, as that launched against the Iranians in 1988. This view was shaped by wildly optimistic reports by the Palestinians, both about the effects of missile attacks and defensive measures. The Israelis actually suffered some 235 casualties, including two dead and 11 seriously injured, with 28 buildings destroyed and 4,100 damaged.<sup>6</sup> The offensive certainly brought Israel to the brink of retaliation and aroused concern among politicians, but the poor performance of the missiles and the effectiveness of the defences seem to have allayed fears. Poor quality-control meant that many Hussein missiles broke up in mid-air and the vast majority fell on empty terrain, with few even reaching the vicinity of the target. In Saudi Arabia there was minor damage with some 70 civilian casualties but, ironically, it was one of the last launched which had the biggest impact, striking an American barracks in Dhahran on 25 February killing 28 soldiers and wounding 98.

It has been claimed that the Iraqis launched a total of 93 missiles; 42 against Israel (38 of which fell within the boundaries of that country), 46 at Saudi Arabia, and three at Bahrain, with two unknown. Their greatest achievement was the destruction of the above-mentioned barracks housing the 14th Quartermaster Detachment of the US Army – a unit specialising in water-purification – in Dhahran, on 25 February 1991, when 28 US troops were killed. In addition to launching al-Husseins, Ayyubi's forces fired 86 FROG-7 unguided ballistic missiles and 2,274 rockets from their Brazilian Astros MLRS. Their greatest success was on 21 February when a FROG landed near Senegalese troops lining up for breakfast, wounding eight.<sup>7</sup>

## SCUD HUNTERS AND PATRIOTS

Potential Scud victims often had time to take cover because the Coalition could provide limited early warning. Satellites sent up in the Cold War detected missile launches and provided an indication of the trajectory. This data was augmented by reports from AWACS and later JSTARS.

The American military leadership had a very low opinion of what Horner described as 'a lousy weapon', however air and satellite reconnaissance failed to detect any TELs. The airmen were over-confident about

their ability to destroy the mobile launchers and had made few preparations for an aggressive anti-Scud campaign, focusing upon the fixed launcher sites together with missile and fuel manufacturing facilities. Some sorties were sent to look for mobile launchers based upon guessing where the launch areas might be based upon the Hussain's 600-kilometre range.

The Coalition response to the Scud threat was to use the airpower sword and the Patriot shield.<sup>8</sup> The US Joint Chiefs had considered on 27 October an early strike against the five static launcher sites, with a total of 28 launchers, in western Iraq but decided this was impractical.<sup>9</sup> The second mission when the Coalition air offensive began started the Scud hunt as Task Force Normandy's attack opened the way for Eagles to strike the static launchers.

The Iraqi TELs operated around three major roads which the Americans dubbed 'Scud Alley'; nevertheless, the Coalition had to search an area of 75,000 square kilometres (29,000 square miles). The hunt for the TELs began the following night using three AC-130H Spectre gunships but these proved too vulnerable to ground fire and they were replaced from 22 January by pairs of high-speed combat aircraft, one acting as the 'eyes' for the other's ordnance. Then standing four-hour patrols of eight aircraft were maintained with F-15Es in the west and LANTIRN-equipped F-16Cs in the east, while up to 90 strike and SEAD sorties a night would be flown against the Scud infrastructure. These missions involved a quarter of the F-15E Eagles and the LANTIRN-equipped Falcons, 7% of Warhogs and 8% of F-111F Aadvarks, until the latter were diverted to tank-hunting, with night operations by Eagles in the west and Falcons in the east, augmented by Aadvarks, Harriers and RAF Tornados. They would involve 20% of F-15E, 2% of A-10, 4% of F-16 and 3% of F-111F sorties. Often the strike aircraft would orbit its sector dropping bombs at intervals to deter launches. Warhogs conducted daylight patrols using Maverick seeker-head imagery and visual searches with binoculars. Storage and manufacturing facilities were targeted by the B-52s and the Nighthawks. While there was a substantial investment of air power in hunting the Scuds, the number of sorties appears to have been only 1,398 and not the 2,493 often claimed. No launchers appear to have been destroyed.<sup>10</sup>

The number of TELs was originally estimated at 48 but later downgraded to a more accurate figure of 18. They were extremely difficult to detect, even on the move, because the Iraqi-built vehicles were based upon the commercial Scania tractor-trailers and caused



The Iraqi-developed al-Waleed TEL, towed by a Swedish-made Scania truck, seen together with an al-Hussein missile. (Courtesy Christopher F Foss)



Wreckage of an al-Hussein ballistic missile seen while being inspected by US and local troops in Saudi Arabia. (Mark Lepko Collection)

confusion among pilots. From the air TELs could be mistaken for tankers taking oil to Jordan while some tents of the nomadic Bedu (Bedouin) might also have attracted ordnance due to their heat signature. In addition, Iraq had purchased some Scud decoys from East Germany. Sometimes pilots witnessed Scud launches but hesitated to fly to the launch site because they confused the rising missile with a surface-to-air weapon. By the time they recognised their mistake the vehicle was moving to cover, indeed it appears that mobile launchers were detected only 42 times, with attacks upon only eight occasions. On the first night 16 TEL were claimed and the airmen would be credited with 80 by the end of the campaign, although these included FROG launchers.<sup>11</sup> Ayyubi reported on 28 January that he had suffered 54 casualties through air attacks, including six dead, with 17 vehicles and 28 launch sites damaged, but that neither vehicles nor missiles had been lost.<sup>12</sup> More than half the Coalition sorties were against the static sites or against potential hiding places such as culverts and this had the added effect of reducing launcher mobility.

It was attacks upon Israel which led to intense pressure from Washington, beginning on the morning of 19 January, to intensify the hunt for Scuds because politicians and diplomats were worried about the effect upon Arab morale and Israel entering the conflict to retaliate, with serious political and diplomatic consequences for the Coalition. Glosson had to promise to spend the rest of the day

targeting Scud sites but he had to add: "I don't know what's going on."<sup>13</sup> But while assigning more aircraft to the Scud mission Horner did not let it undermine his air campaign.

Aware that their precision attack capability had had limited success, at best, the increasingly desperate Coalition began to emphasise suppressive tactics, including pre-emptive strikes in Scud-launching areas by B-52s using CBU-58 cluster munitions, from 19 February until the end of the campaign.

The USAF reluctantly recognised 'Scud hunting tactics were ineffective if measured in terms of numbers of Scud-associated vehicles confirmed destroyed' but consoled itself by claiming '...it seems clear that the destructive and suppressive effects of anti-Scud tactics combined to significantly reduce the launch rate.' The Americans later admitted they were unable to confirm the destruction of a single TEL, indeed the missile offensive was limited by a shortage of weapons and fuel and the Iraqis would state the air offensive had very little effect upon their offensive.<sup>14</sup>

An active defence against the ballistic missile was provided by the Patriot surface-to-air missile system which certainly boosted civilian moral. Designed to meet manned aircraft, the system had been given an anti-ballistic missile capability although the blast fragmentation warhead was arguably not the best way of destroying a ballistic missile target. Batteries were alerted about incoming missiles so their sensors could be pointed in the right direction for an interception, usually by three missiles. Patriots and Scud approached each other at a combined velocity of Mach 11 with interceptions at ranges of 70 kilometres and heights of 24,000 metres. It has been claimed that 158 Patriots were launched and their success rate has been fiercely debated, with the Americans initially claiming a wildly optimistic 96% success rate, while some scientists using extremely narrow parameters claimed only 9%. The US Army claimed it was confident that 40% of the interceptions had been successful, and this is probably correct. To defend Israel, 32 Patriots were delivered soon after the first Scud attack and Tel Aviv claimed a 44% success rate. Nevertheless, Patriot is a complex system and the one Iraqi success at Dhahran appears to have been due to a technical fault which led the system to assume it was a spurious missile track and to ignore the incoming weapon.

A third strand of Scud defence were the Coalition special forces. Nearly 8,700 strong, these included the US Army's Green Berets of the 3rd and 5th Special Forces Group, as well as the 1st Special Forces Operational Detachment-Delta ('Delta Force'), and a Ranger



company, together with the British Army's Special Air Service (SAS) Regiment augmented by members of the Royal Marines' Special Boat Service (SBS), French, Kuwaiti and Saudi troops, while the French also deployed six Special Forces reconnaissance teams; 120 volunteers of the 1st Marine Paratrooper Regiment (1er RPIMa) as the ad hoc 1er Groupement Commando Parachutiste (1er GCP).<sup>15</sup> The Americans were supported by the 160th Special Operations Aviation Regiment (Airborne) with 20 modified AH-6 light attack, MH-60 utility and MH-47 medium-lift helicopters, while the USAF Special Operations Squadrons also provided support with some 50 aircraft.<sup>16</sup> The availability of aircraft which saw the territory split horizontally roughly along the Jordan-Baghdad highway with the Americans operating to the north and the British to the south.

Schwarzkopf, and most of the senior US Army commanders, were sceptical about Special Forces and it took a senior British commander, Sir Peter de Billiere (a former SAS commander), to change his mind. In late January he persuaded Schwarzkopf that Special Forces could not only interdict enemy communications and provide valuable reconnaissance but also help hunt the Scuds and to conduct battle damage assessment.<sup>17</sup>

With half of the SAS in Saudi Arabia, the British were the first to deploy from al-Jouf, on 20 January, using vehicles to cross through gaps in the berm which marked the frontier. Before conducting an attack, the SAS had to seek approval. Although failing to find any of the TELs, they destroyed a number of bridges, captured some officers for interrogation and contaminated fuel supplies. A few of the units also carried laser target designators although they may not have used them. One patrol, the famous Bravo Two Zero, was intercepted by security forces of 224 Brigade and of the eight men: three died and four were taken prisoner, only one escaping to Syria.

With the 5th Special Forces Group committed to liaison and training missions, a battalion of the 3rd Special Forces Group was brought in for long-range patrols operating from Judayyidat Ar'Ar (Ar Ar). Compared with the British they were better equipped and had dedicated medium/heavy lift helicopters to ferry troops and vehicles; USAF MH-53J Pave Low and US Army MH-47E helicopters, while the British had to share the RAF Chinook force with the other arms. Some of the 160th Regiment's MH-60 Black Hawks interdicted the roads and Scud infrastructure with 'Thunder Runs.' The aerial largesse meant that Special Forces teams, usually of about 20 men with a USAF combat controller for air support, had shorter patrols compared with the SAS, of rarely more than 10 days.

US Satellite Communications (Satcom) systems to link with their command were also more reliable, although the systems could not be used on the move. Until the Americans loaned some Satcom systems to the British, they had to rely upon high-frequency radios which were vulnerable to environmental conditions, and to call down strike aircraft they had to use their TACBE radio distress beacons. Their messages were relayed to the TACC, which would transmit the information to AWACS which would assign strike fighters. Satcoms also meant the Green Berets received daily intelligence updates for more efficient operations and they were reportedly more successful in detecting mobile launchers.

About a dozen reconnaissance patrols were staged, mostly to support VII and XVIII Corps, but they were plagued by poor intelligence, although they did provide some useful information. They were also used to support search and rescue missions for downed airmen. The latter were the only Special Operations permitted by Ankara into northern Iraq by the Turkey-based A Company/10 Special Forces Group.<sup>18</sup>

Helicopters made it possible for a combined SBS/Green Beret/USAF team to be inserted near Baghdad to cut communications cables and then be extracted without detection. But usually, the Special Forces would operate at night and hide during the day, often in carefully camouflaged positions in wadis. The absence of reference points in the desert made navigation difficult even with Global Positioning Systems (GPS) and compasses, while limited ambient light in the desert at night meant night-vision devices were often almost useless. The troops faced huge ranges in temperature variation and the bitterly cold nights caused SAS fatalities due to hypothermia.

Much of the American Special Forces effort focused upon reconnaissance to produce a picture not only of enemy strength, dispositions and capabilities but also of the terrain over which the land forces would advance; indeed there were a dozen deep reconnaissance missions. US Navy SEAL teams also operated along the coast designating targets with lasers, conducting demolitions of beach obstacles and retaking offshore oil platforms.

A major problem for Special Forces, even in the desert, was the presence not only of Iraqi security forces but, even more important, civilians including nomad Bedu goat herders and their families. Whatever their attitude to the Iraqi government they would usually report sightings of helicopter landings or the presence of enemy troops, usually receiving payment, with the first reports from 20 January, the day the SAS were first deployed.<sup>19</sup> The previous day Saddam had been so concerned about the security of his missile force that launcher and supply convoys received stronger escorts, with convoys sometimes having a dozen escort vehicles, yet the SAS are reported to have intercepted some convoys with Milan anti-armour missiles and in response to strengthened convoys deployed bar mines and explosive charges. Iraqi countermeasures were supported by excellent COMINT units whose presence restricted Special Forces' use of radios and as the threat grew the elite Iraqi Unit 999 was deployed to augment commando and Special Forces companies. One of these was inserted by three helicopters on 13 February but was seen by their prey who called down strike aircraft which destroyed two Iraqi aircraft.

## IRAQI PLANNING

While the first weeks of Desert Storm were largely confined to the skies, on 29 January the Iraqi Army suddenly launched its long-awaited offensive into northern Saudi Arabia. It was heavily defeated by 1 February, yet it left the Iraqis exultant and the Coalition commanders puzzled, even if extremely confident about the future.

Saddam was anxious to avoid or reduce the impact of the Coalition ground offensive which he suspected was imminent. One means was to destroy the Kuwaiti oil industry: on his order, the Iraqis began experimenting with firing oil wells and before dawn of 17 January the III Corps' 8th and 29th Infantry Divisions were ordered to sabotage the Wafrah and al-Burqun oil wells, while during the afternoon a column of captured tankers began pumping oil into the sea. Two days later the Iraqis opened the pumps at the Ahmadi loading site so that oil flowed into the Gulf at the rate of 200,000 barrels per day to create an ecological disaster. From mid-February the Iraqis began systematically wrecking Kuwaiti oil wells and by the end of the war 798 had been blown up, of which 603 caught fire and 45 gushed oil to contaminate 62 million cubic metres of soil: the damage and loss cost Kuwait over US\$50 billion.<sup>20</sup> Missiles and rockets aimed at Saudi Arabia – including artillery shelling of an oil tank outside al-Khafji on 19 January – were another means of dissuasion.<sup>21</sup>





A NASA photo showing massive columns of black, hot smoke from burning oil wells blown up by the Iraqis both north and south of Kuwait City. (NASA)

Like most autocrats, the Iraqi leader loathed the idea of inaction and sought a more direct approach. Therefore, both the RGFC and the Army received the order to plan an offensive into northern Saudi Arabia. Contingency plans for this operation had been drawn up by both the Guards Corps and General Headquarters (GHQ) from almost the moment their tanks had reached the Kuwait-Saudi frontier: on 19 January 1991, the GHQ sent a radio message to the responsible corps commanders – via an open channel – ordering them to prepare for an offensive. This was apparently a ruse whose purpose may well have been to cow the Arab elements of the Coalition. However, the following day GHQ sent encrypted instructions to the corps for a series of raids around the border to take enemy prisoners and to entice the Coalition into a debilitating battle of attrition, at a time and place of Baghdad's choice, in order to inflict a crushing physical and moral defeat similar to that inflicted upon Tehran.<sup>22</sup>

Saddam believed the air offensive was a sign of weakness which was being conducted because the Coalition feared beginning ground operations and one aim of the attack was to take as many American prisoners as possible to act as a diplomatic bargaining chip. Dusting off and updating the old plans, Defence Minister Lieutenant General Saadi Tuuma Abbas and Chief-of-Staff Lieutenant General Hussein Rashid Muhammad presented a plan to take the town of al-Khafji (Khafji) apparently at the suggestion of III Corps commander Major General Salah Aboud Mahmoud. The town was only 20 kilometres from the Kuwaiti frontier and close to both the Dhahran oil centre and the main Coalition concentration, while the Iraqis were familiar

with it because they had exported their oil through it during the war with Iran. If they could hold the town and win the anticipated battle of attrition then Khafji could be a jump-off point for deeper penetrations into Saudi territory.

It was known that the Coalition had only a screening force along the frontier and it was anticipated they would withdraw when faced with a larger force, but the planners also recognised that navigating through the featureless desert would be difficult and that their troops would be exposed to air attack.<sup>23</sup> The main operation would be directed by General Salah Aboud's III Corps from the Kuwait salient, which pushed into Saudi territory and resembled the heel of a shoe, with Lieutenant General Yasin al-Maini's 5th Mechanized Division as the spearhead to take Khafji. Its right was covered by Brigadier Hassan Zidan's 3rd Armoured Division in a brigade-size diversionary operation up to 25 kilometres deep into Saudi territory. Diversions on his right would be provided by Major General Aiyad Khalil Zaki's IV Corps, using Major General Hussein Hassan Adai's 1st Mechanized Division, which would pass through positions of the 7th and 14th Infantry Division. These would then drive 20 kilometres eastwards into Saudi Arabia before circling round for 25 kilometres to re-enter the corps area where it had departed. VII Corps, under Major General Ibrahim Hamash, would launch a raid in the 54th Infantry Division's sector on the Iraq-Saudi border, controlling three brigades provided by the corps.

By the time the operation was launched, the Iraqi Army had begun withdrawing most of its forces from the Saudi frontier, but although this made travel hazardous Salah Aboud began a personal reconnaissance from 21 January. He paid particular attention to the Wafrah Forest where he recognised that he could conceal his assault forces. To avoid a pitched battle within a built-up area he decided to envelop the town from the south. One reason for selecting the 5th Mechanized Division was because the soft nature of the ground, including the presence of sabkhas (salt flats), meant its Soviet-made MT-LB APCs were especially capable in such terrain.<sup>24</sup> However, Salah Aboud lacked accurate information on enemy strength and dispositions. He briefed his two divisional commanders on the morning of 23 January and the following day attended a conference at II Corps headquarters with the Defence Minister Lieutenant General Saadi Tuuma Abas and Army Chief of Staff Lieutenant General Hussein Rashid Muhammad, the Director Chief of Staff for Operations, Lieutenant General Sultan Hashim Ahmad, and the Director of GMID Lieutenant General Saber Abd al-Aziz. They discussed co-ordinating operations with IV Corps, and some suggested a move southwest rather than southeast but the latter provided a more reachable prize.

Hussein Rashid wanted to strike on 27 January but Salah Aboud said this did not give enough time for his forces to reach their jump-off line, so it was agreed to postpone the offensive to 29 January with H-Hour at 20:00. Salah Aboud agreed with his division commanders that an infantry brigade would move forward to cover the necessary breaches in the obstacle-belt and as Salah Aboud was determined not to commit his corps reserve he decided to use 6th Armoured Brigade of the 3rd Armoured Division which was placed under the operational control of 5th Mechanized Division. The latter was to stage a diversion using a battalion-size battle group that was to advance 15 kilometres before withdrawing.

Planning was completed by 02:00 on 27 January and during the morning there was a meeting attended by General Sultan Hashim Ahmad, the Director of Operations and other corps commanders to review the plans. The initial operation would be for a 20-kilometre penetration into Saudi territory. If this was successful it would



A US-made Bell 214ST helicopter of the Iraqi Army Aviation Corps (IrAAC), used for liaison and VIP-transport during the 1991 War, seen after being captured by US forces in Kuwait. Originally manufactured for an Iranian order cancelled in 1979, 48 214STs were eventually sold to Iraq instead. (US DoD)

be followed by another up to 150 kilometres in 48-72 hours and possibly a third even deeper. When Salah Aboud returned to his headquarters, he received a message asking him to attend a meeting at Southern Intelligence Headquarters within the Guards tactical area of responsibility near Basra at 20:00. This meant a dangerous drive along cratered roads, damaged bridges, burned-out vehicles and past bombed-out buildings. He entered the room lit by candles, because air attacks had cut power distribution, to find Saddam, the Defence Minister Saadi Tuuma, Hussein Rashid (who had driven down from Baghdad), as well as corps and division commanders. After a formal briefing and approval of the plan, Saddam gave a pep talk during which Salah Aboud promised him Khafji and Saddam smilingly said he was certain of it and would be waiting for his present. However, Salah Aboud was unable to discover exactly how long he was supposed to hold the town and warned General Hussein Rashid that when the enemy discovered what the 5th Mechanized Division had done they would focus their air effort upon it, and so he recommended withdrawing the next night.<sup>25</sup> The generals now made the hazardous journey home, Saddam's entourage coming under unsuccessful air attack, while the III Corps leaders went to the 5th Mechanized Division command posts in the al-Maqwa oil facilities for detailed planning although hampered by poor quality maps.

The 26th Armoured Brigade would punch through the frontier defences around the coastal highway which it would then shield from the west, while 20th Mechanized Brigade drove down the highway to enter Khafji from the north. Meanwhile, 15th Mechanized Brigade would approach through the desert and enter the town from the south. Salah warned that the division had to get into Khafji quickly and then ensure that by morning it was well dug-in with heavy weapons concealed and he suggested burning tyres would confuse airborne infra-red sensors. Each column would advance on a 4-kilometre front to reduce the risk from air attacks, with tanks and modified APCs towing 57mm anti-aircraft guns, while MANPAD teams would be distributed throughout the columns.<sup>26</sup> During 28 January, Salah Aboud and his divisional commanders conducted personal reconnaissance and completed planning, including opening and closing lanes through the minefields and

the problem of moving forces forward in conditions of enemy air domination. Indeed, both divisions had received their share of aerial pounding while Kill Boxes AG 4, AH 4 and AG 5, through which they had to move, had been subjected to 391 sorties by 29 January.<sup>27</sup>

The 20th Mechanized Brigade of the 5th Mechanized Division had fought the Israelis on the Golan heights in 1973 and the division had distinguished itself during the war with Iran, usually operating under III Corps on the Basra front where it had frequently acted as the corps fire brigade and then helped to spearhead many of the 1988 offensives on this front. Coalition intelligence had assessed its strength at the beginning of the air offensive at 177 MBTs, 249 IFV/APCs, 72 guns and 10,800 troops.<sup>28</sup> But despite the crisis, as in the Iran-Iraq War, Saddam remained over generous with leave and interpreting post-war figures suggest that up to 25% of the troops were on leave, leaving the division with only 6,000 men that could man just 105 MBTs, with similar reductions in other heavy weapons.

Eventually, this proved an advantage. The 6th Armoured Brigade moved forward on 29 January – always in small formations exploiting every piece of cover around the highway (fortunately for the Iraqis, there were many buildings which could be exploited). Dense, hot smoke from burning oil also provided cover with the result that despite the attentions of Marine Harrier tactical fighters and Navy A-6E Intruders with Rockeye cluster bombs, and Warthogs with Mavericks, the 5th Mechanized Division lost only two tanks.<sup>29</sup> Some columns were detected by the newly-arrived JSTARS aircraft which had been flying 14-hour missions from 22 January. Although still at the engineering development stage, and requiring specialist technical contractors to support them, their sideways looking radar with moving target indicator system detected large scale movements, although much of the early effort was in support of the Scud hunt. To ensure surprise, the vehicles and guns which had departed were replaced by obsolete equipment and other decoys which acted as an ordnance magnet and also confused American spy satellites. However, soft-skinned vehicles bringing supplies or towing artillery were more exposed and most had to move at night. There was a shortage of spares, with vehicle maintenance having to be conducted at night. In order to feed his men Yasin al-Maini had to slaughter 120 cattle he discovered in a Kuwaiti farm, and the problem of supply



was so serious that the only food supplies to cross the border were 4 tonnes of dates and a seven-day-supply of bread.<sup>30</sup> By dusk the division was in its jump-off position while 6th Armoured Brigade had reached the al-Wafrah Forest, which consisted of scattered trees – or clumps of trees and oil wells – covered by FROG missiles fired westward from the positions of the 7th and 14th Infantry Divisions. Although aware of enemy movements CENTCOM interpreted them as part of an exercise.

### BATTLEFIELD

The terrain consisted of relatively flat sandy desert rising gently in the west but still under 150 metres. The border was marked with a 4.5-metre-high berm and on the Saudi side lined at 25-kilometre intervals with white border posts with crenulated roofs, universally referred to by the Americans as Beau Geste forts after P.C. Wren's famous, and oft-filmed, story of the French Foreign Legion. The coastal highway from Kuwait ran past a water desalination plant 6.5 kilometres from the border and then through Khafji, with two side roads running inland from a bypass west of the town, before passing through a series of sabkhas some 30 kilometres wide and deep, with a smaller one north of the town on the western side of the highway.

Khafji was a town of 15,000 inhabitants before the war and was situated north of a long, narrow inlet with an oil refinery on a spit of land on the opposite bank. There was a water tower on the southern edge of the town, just north of the sabkha, and a Saudi Arabian National Guard (SANG) compound just outside the town's arch-lined western entrance. Plans to evacuate the civilians had not been implemented at first to avoid panic, but many had drifted inland, mostly during the school holidays, and the remainder were evacuated in some haste on 17 January leaving white tablecloths and tea pots on the tables of the Khafji Beach Hotel restaurant, while camels and dogs roamed the empty streets.

### COALITION FORCES

The defence of the Kuwaiti border was a Saudi responsibility, with the eastern section under Major-General Sultan Ibn Al-Mutairi's Joint Forces Command (JFC) North while the western section and the Iraqi border was the responsibility of JFC East. General Sultan had 37,000 men organised into four task forces equivalent to reinforced brigades; with Omar, Othman and Abu Bakr deployed west to east and Tariq in reserve shielding the oil facilities at Safaniya. These forces had been deployed by Prince Khaled

on 18 August along a main line of resistance some 25 kilometres from the border, west of Ras Mishab, each with a battalion and an armoured reconnaissance squadron forming a screen some 5 kilometres from the border. Their orders were to withdraw if they came under Iraqi attack. Task Force (TF) Abu Bakr and – to a lesser degree – TF Othman would meet the enemy, the former based on the 2nd SANG Brigade with a Qatari mechanized battalion, and the latter with the 8th Regular Brigade augmented by a rifle company each from Bahrain and Kuwait. There was also a Saudi marine company in Khafji although Prince Khaled would later claim there were no troops in the town.<sup>31</sup>

The Americans augmented the Saudi screen along the Kuwait border with their own screen of observation posts (OPs) some 20 kilometres apart, these being numbered in the sequence in which they had been occupied:

- OPs 6 to 4 (north-to-south) in the JFC North sector. They were especially valuable because the slope of the ground meant they could look over the berm deep into Kuwait and were manned by 1,200 men of Task Force Shepherd based upon Lieutenant Colonel Clifford O. Meyers' 1st Marine Light Armored Infantry Battalion.
- OPs 1 and 2 on the left of General Sultan's sector were manned by 2nd Marine Light Armored Infantry Battalion.



The service area of the US Marines at the abandoned Kibrit airfield, seen from a helicopter in January 1991. (USMC)



An LAV-25C2 command vehicle of the US Marine Corps rolling in one of the forward operating bases in north-eastern Saudi Arabia. Notable in the rear is an AH-1T Sea Cobra attack helicopter. (USMC)



- OPs 7 and 8 on the right of the sector covered the coastal highway were occupied by US Special Forces, Navy SEALs and Marine reconnaissance troops.

Each battalion had three companies with 20 wheeled Light Armored Vehicles (LAV) – mostly LAV-25 but including seven anti-armour LAV-ATs, equipped with BGM-71 TOW anti-tank guided missiles. Most of the screen in Sultan's sector was under the 1st Marine Surveillance, Reconnaissance and Intelligence Group, commanded by Lieutenant Colonel Richard M. Barry: his forward command post was positioned in the desalination plant. Barry also had two Air Naval Gunfire Liaison Companies (ANGLICO) teams. In reserve was TF Taro, based upon Colonel John H. Admire's 3rd Marine (Infantry) Regiment – part of Major General James M. Myatt's 1st Marine Division which included the US Army's 1st 'Tiger' Brigade/2nd Armored Division. With a Coalition ground offensive scheduled, the Marines were especially sensitive to the fate of their main supply depot nearly 50 kilometres south of the border at the abandoned airfield of Kibrit. Construction had begun on 27 December and by the end of January it was 15 kilometres long and 6.5 kilometres wide, covering 65 square kilometres. To support the forward forces Air Task Force Cunningham was established and this also drew up plans to support General Sultan's forces, yet there remained tension between the Americans and the Saudis who regarded each other as unknown quantities, did not share information, and were not even in radio contact.

Tension along the frontier had been growing for more than a week before the Iraqi offensive, with an increase in Iraqi patrolling and probing along both borders with Saudi Arabia from 22 January. It was especially noticeable north of Khafji, and on 28 January the Marines reported they might have been viewed by a UAV. However, major probes were undertaken by day, by conventional forces, and usually driven off by air- and artillery strikes. Colonel Barry warned CENTCOM this indicated an Iraqi attack was imminent, but his superiors were more interested in the air campaign. Two days earlier the Pentagon's Joint Intelligence Center reported intercepting a message arranging a commanders' conference in III Corps: the potential conference site was promptly wrecked by Aardvarks,

which narrowly missed the helicopter that had landed nearby. The Iraqis also fired their artillery and MRLs into Saudi Arabia, after bringing these in position with the help of headlights – even when this attracted enemy aircraft.<sup>32</sup>

The Coalition's corps on the left, VII and XVIII Airborne, themselves began probing around the frontier and beating off enemy patrols. From 21 January the US Marines began a series of artillery raids, each with one or two batteries, which drove up to the frontier, fired, and then rapidly withdrew to avoid counter-battery fire. The latter was the signal for Marine and naval aircraft to go into action in detachments of four aircraft, half A-6E Intruders and the others supported by SEAD detachments of 2 F/A-18Ds, 2 F/A-18s and an EA-6B Prowler.

### AL-KHAFJI: AN ENIGMA OF A BATTLE

On the moonlit night of 29-30 January, the Iraqis moved to their jump-off lines and at 20:00 began to cross through the gaps that engineers had made in the frontier berms as Salah Aboud learned that the Coalition had bombed the 6th Armoured Brigade's former positions. The most disputed combat was in the east with IV Corps' attacks on the observation posts. The corps' engineers had also prepared revetments for AFVs, temporarily filled anti-armour ditches and cleared lanes through minefields. The 1st Mechanized Division advanced upon OPs 6 and 5, led by 34th Armoured Brigade and followed by 27th Mechanized Brigade (reinforced by a rifle battalion from 1st Mechanized Brigade) and then 1st Mechanized Brigade. These were engaged by C Company/1st Light Armored Infantry Battalion which advanced, firing anti-armour missiles, and having secured OP 6 it called for air strikes. By morning the Iraqis had withdrawn, the commander optimistically claiming he had advanced 50 kilometres into Saudi territory before withdrawing, with soaring morale, having suffered light casualties.

The main battle was around OP 4 held by D Company/3rd Light Armored Infantry Battalion, augmented by Marine reconnaissance troops, who are usually described as being engaged by 6th Armoured Brigade (Colonel Abdul Raziq Mahmoud). While Iraqi documents show this brigade's axis of attack was east of OP 4 and it appears the observation post may actually have been attacked by part of the brigade, but after it reported losing two tanks Salah Aboud ordered it simply to mask OP4. The rest of the brigade drove south, advancing some 20 kilometres (it claimed 29), and become embroiled in the American defence of the former, with catastrophic results both for the Iraqis and Americans.

After engaging the attackers with infantry weapons, the defenders of OP 4 were ordered to withdraw in their LAVs, as TOW-equipped LAV-ATs drove up to cover them. In a tragic mistake a Marine-launched TOW destroyed a LAV and when Warthogs arrived to provide air support a rogue Maverick missile destroyed another. The defence was initially hampered by the enemy jamming of radio communications from 18:30, until Iraqi tanks began to open fire, but the VHF frequency-hopping Single-Channel Ground and Airborne Radio System (SINCGARS) was immune and the forward troops were eventually able to contact Meyers. Soon, USAF Warthogs and USMC Harriers and Cobra attack helicopters began to attack the exposed 6th Armoured Brigade which was also struck from the flank by Marine TOW missiles. At 23:30 the brigade was ordered to withdraw and had re-crossed the frontier at midnight: by dawn it was back in the Wafrah Forest, but admitted it had 'suffered major losses'.<sup>33</sup> Despite this, at 10:00 on 30 January 3rd Armoured Division was ordered to move its other armoured formation, 12th Armoured Brigade, to the border from Wafrah Forest, after dusk,

**TABLE 15: COALITION ORDER OF BATTLE, BATTLE OF AL-KHAFJI, 29-31 JANUARY 1991**

UNIT	PRIMARY SUB-UNITS
TF Abu Bakr	2nd Brigade SANG, Qatari Mechanized Battalion
TF Othman	8th Mechanized Brigade RSGF, Bahraini and Kuwaiti rifle companies
TF Omar	10th Mechanized Brigade RSGF, Omani battalion
TF Tariq	Two battalions of RSN Marines, 1 Moroccan infantry regiment, 1 Senegalese infantry battalion (minus one company)
Reserve	Qatari Mechanized Infantry Battalion, Emirati Infantry Battalion
TF Shepard	3 companies from the 1st Marine Division; 2nd Marine Light Armored Infantry Battalion; 1st Marine Surveillance, Reconnaissance and Intelligence Group; A & C Batteries, 1st Battalion, 12th Marines

ready to cross at midnight as Salah anticipated success. But this movement stirred a hornet's nest of aerial retribution and within 24 hours this unit was ordered to return.

Some 55 kilometres to the west, the Iraqi VII Corps' diversion involved an advance by 54th Infantry Division towards Ar Ar using a spearhead consisting of an armoured brigade and two commando brigades. The former claimed to have advanced 20 kilometres and the latter half that distance before withdrawing at dawn. Although Ar Ar was a major Special Forces base there is no evidence of any significant Coalition response.

Meanwhile, fearing for the safety of Kibrit, which was under command of the Marine's logistic chief, Brigadier General Charles C. Krulak (a famous name in the Corps), organised a hasty defensive perimeter from support troops and called for support from the Tiger Brigade which arrived around midnight. While these Iraqi efforts failed to penetrate deeply or take any prisoners, they did succeed in drawing the Coalition's attention from the main thrust.

This thrust was led under radio silence from 20:00 by 5th Mechanized Division's 26th Armoured Brigade which crossed the border at 20:15. An hour later they reached the desalination plant north of Khafji as the Saudis and Americans rapidly withdrew – the latter five minutes before the Iraqi's crossing, leaving behind maps, confidential documents and cryptographic equipment which, fortunately, the Iraqis ignored. The Saudis, including the marine company which quit the town, often left behind their helmets but took flak jackets (which they also used as prayer mats). Once the Iraqi armoured brigade reached its objective it formed a screen west of the coastal highway as 15th Mechanized Brigade, reinforced by an infantry battalion from 20th Mechanized Brigade, rolled down the highway into northern Khafji, losing two tanks in a sabkha. Meanwhile the remainder of 20th Mechanized Brigade drove south through the desert between OP 7 and the highway guided by artillery illumination rounds but still had navigation problems and also lost some vehicles in soft sand. Having driven some 15 kilometres, the brigade swung eastward to avoid the sabkhas and at 23:50 entered Khafji from the south, blazing away wildly but securing it by 01:00.

The Iraqi troops then began to conceal themselves and their vehicles within the buildings, with 15th Brigade north of the highway and 20th Brigade to the south. A 30-kilometre telephone cable was laid to ensure contact with the GHQ in Baghdad which informed Salah that the decision to stay, or abandon Khafji, was his. He decided to stay in the hopes of later pushing down to Mishab, 30 kilometres to the south, although he was unable to assemble the supplies to achieve this objective. As dawn approached all vehicles abandoned the highway. However, plans for part of 440th Naval Infantry Brigade to be brought in by sea failed when Coalition aircraft sank many of the vessels carrying the troops, with the surviving vessels turning back. The Iraqis still lacked a clear picture of the enemy and the Khafji garrison had no idea how long it was to remain, and was also short of supplies and support weapons, although corps tube and rocket artillery was nominally available. An infantry brigade was ordered into the town while 12th Armoured Brigade moved forward to support 5th Mechanized Division.

Unknown to the garrison, US Marine reconnaissance teams and ANGLICOs were concealed in the apartment blocks, with the latter calling down artillery strikes to secure their position. CENTCOM, who believed the whole of the division was advancing on Khafji, initially interpreted the operation as a spoiling attack and only later as a propaganda ploy. Schwarzkopf commented, 'My staff and I were perplexed. There was no evidence that Iraq was getting ready

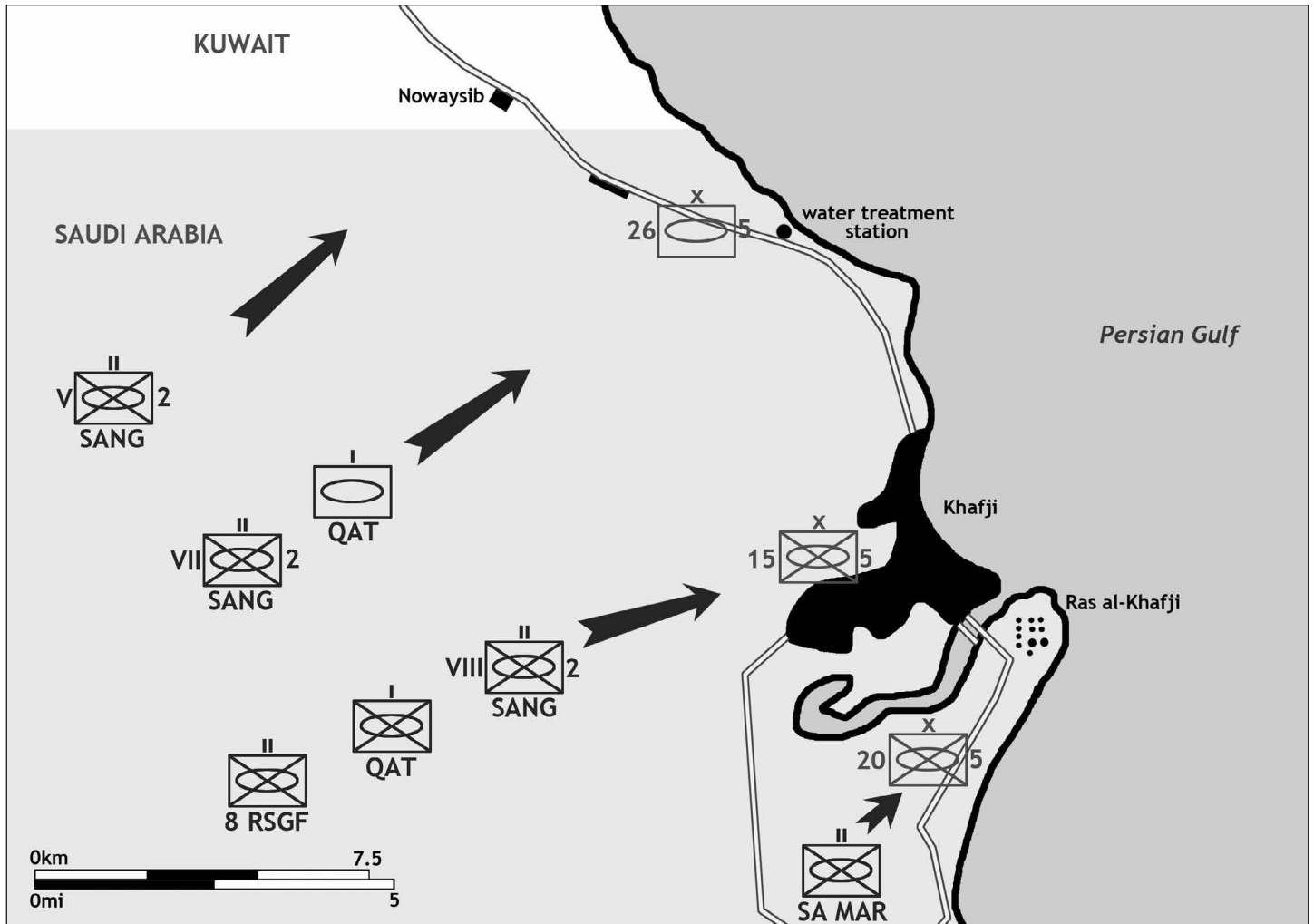
to launch a major offensive, yet to attack Saudi Arabia with a single division defied military logic.'<sup>34</sup>

The TFC-East commander, General Sultan, apparently learned that the enemy had crossed the frontier from his American liaison officer, and not his own troops, but appears to have blamed his allies for the Iraqi success. At 03:00 Sultan conducted a personal reconnaissance, ordering an 8th Brigade company and the Qatari battalion to join him 6.5 kilometres west of Khafji, and while he awaited their arrival he approached Khafji on foot and determined it was held by the Iraqis. He ordered the Saudi-Qatari force to engage and hold the enemy, while returning to his command post at Rish al-Manjur, 40 kilometres south of Khafji at 13:00. Two hours later he was joined by General Prince Khaled who had been at an awards ceremony in Riyadh and who initially believed Sultan faced only a raid. Khaled now realised it was more serious, especially the loss of the town which left King Fahd furious, and told Schwarzkopf he wanted Coalition aircraft to obliterate Khafji but was met with a polite refusal.<sup>35</sup>

The absence of Coalition, and especially American, air power certainly strained the Coalition. Upon hearing Sultan's complaint Prince Khaled promptly telephoned Horner at the Tactical Air Control Center (TACC) and demanded immediate air support, but this had not appeared an hour later, leaving the Saudi prince hopping mad, if only from response. He demanded B-52 strikes and was brusquely told, 'Don't tell me how to do my job. Tell me what you want done'. The Saudis convinced themselves the Americans were restricting their operations to the west just to shield Kibrit and were indifferent to their allies' needs. The situation was more complex for when the Iraqi offensive began the TACC was fully absorbed in directing the air offensive and paying little attention to the incursion.

It was only when Glosson entered the TACC to monitor the night's activities and plan future operations that he learned of the incursion and awoke Horner who was also ignorant of events on the border. In fact, Marine attack helicopters had already gone to support the western OPs from 21:38 and were soon joined by USAF strike fighters, but Horner instantly saw an opportunity for which he had been preparing almost from the moment he arrived in Saudi Arabia; the chance to hammer exposed Iraqi troops. During the night he diverted some 140 strike aircraft to the eastern and western sectors and they very quickly began to have an effect, together with naval gunfire support directed by Broncos, smashing columns of AFVs and soft-skinned vehicle convoys. JSTAR supported attacks upon 5th Mechanized Division began at 23:00. Many aircraft hit Boxes AG-4 and AG-5, with 200 sorties by 1 February, while by 31 January 262 sorties had been flown in the Khafji area alone. Iraqi troops were reduced to firing RPGs at their tormentors, although a man-portable surface-to-air missile launched by 20th Mechanized Brigade shot down an AC-130 Spectre fixed-wing gunship which made the mistake of remaining over the battlefield at dawn.<sup>36</sup> Between 29-31 January more than 1,000 sorties were flown in the southern KTO sector alone, and by 1 February air power was credited with destroying a wildly optimistic 544 MBTs, 314 APC/IFVs and 425 guns. The truth was that with little experience of providing air support for their own forces, the Saudis' expectations in terms of response times and numbers were unrealistic.<sup>37</sup>

As Coalition air power began to make itself felt, Prince Khaled began pushing for a counter-offensive and while Colonel Admire met 2nd SANG Brigade commander, Colonel Turki al-Firmi, and promised support, the prince was determined that this would be an Arab effort, telling his deputy Major General Abd al-Aziz ash-Shaikh



A map of the Saudi and allied counterattack which ended the Battle of Khafji, fought on 29-31 January 1991. (Map by Tom Cooper)

to stay with Schwarzkopf and “....make sure no-one acts. This is my battle!” Sultan’s original idea was simply to besiege the town, but Prince Khaled wanted it retaken, although when he learned of the continued Marine presence this proved an added complication. The situation was further aggravated when two lost US Army HETs drove into Khafji and the crew of one of them was captured. As the Saudis regrouped there were a number of friendly fire incidents involving their own, Qatari and US forces, but without serious loss.

The first attempt on 30 January, which included a rescue element for both the Marines and the Army drivers, was only partially successful, although in the confusion the Marine reconnaissance teams escaped. The Saudis, largely drawn from TF Abu Bakr, lacked detailed maps and had no communications with Qataris and, despite the presence of a Marine liaison team, also lacked any means for calling in air and artillery support, the latter including two US Marine batteries.

The 8th Saudi Brigade and Qatari companies, reinforced by V Battalion/2nd SANG Brigade and Qatari HOT anti-tank missile platoons, swept north to cut the coastal highway near the desalination plant. It appears that 26th Brigade failed to report the Saudi success and when the divisional commander became aware of the situation on the following day, he believed he had been isolated by heliborne troops. At this point the Saudi Army company withdrew due to justified fears of attacks by friendly aircraft given a succession of friendly fire incidents during the previous night. Despite this the blockade held and secured a steady trickle of prisoners. During the late afternoon the VII Battalion/2nd SANG Brigade, supported by a Qatari tank company with AMX-30s, drove into Khafji. The

Saudi V-150 Commando wheeled APCs suddenly accelerated into the town ahead of the tanks, leading to a wild battle in which both sides blazed away with everything they had, one Qatari and three Iraqi MBTs being destroyed. The Iraqis had the advantage of cover in the numerous buildings, with the desert and the broad avenues exposing the attackers who were forced to withdraw.

On 31 January Salah Aboud planned to go to Khafji, but then received a telephone call from his operations officer saying he was coming to meet him with IV Corps commander General Ayad Zaki to discuss the second penetration plan. But as they drove over, 5th Mechanized Division Commander Yasin al-Maini reported an enemy armoured counterattack from the west and a helicopter landing by the desalination plant leading to fears the division would be isolated.

These fears grew throughout the day as Khaled and Sultan prepared to attack, having reinforced the assault force with VIII Battalion/2nd SANG Brigade. Prince Khaled had wanted to attack at dawn but Sultan pointed out that the Iraqis usually took a break at 08:00, and so they decided to strike then. For all of their success, General Salah Aboud was only too aware his troops were exposed in Khafji and taking a steady stream of casualties. He radioed a request to withdraw on the grounds that “The mother (of all battles) is killing her children” but this was rejected. The strain of air attacks was demoralising his troops who sometimes used RPGs against aircraft, while 122mm batteries fired airburst shells against attack helicopters.

The new Saudi attack went in at 08:30 and as the Commando APCs entered the town they met a hail of RPG rounds which





One of the LAV-ATs of the US Marine Corps deployed in north-eastern Saudi Arabia, showing detail of the twin launcher for BGM-71 TOW anti-tank guided missiles. (US DoD)



A US Marine inspecting a damaged Iraqi T-54 main battle tank outside Khafji. Note the USMC LAV-25C2 command vehicle in the background. (US DoD)

knocked out three, but the Saudis and Qataris fought bravely, the VIII Battalion working its way along the north of the town, destroying a battalion from 15th Brigade while the VII Battalion was in the south. Throughout the day the Saudis slowly worked their way into Khafji at a cost of some 70 casualties and seven Commando vehicles. By 18:30 a bridgehead had been established in the south of the town, but part of VII Battalion was withdrawn for resupply, with the Qatari tanks being sent north to support the roadblock. The final clearance of the town began on the morning of 1 February, by which time most of the Iraqis had escaped while the demoralised remainder were now more inclined to surrender. By 13:30 the Saudis had reached the town centre, although mopping up continued until dusk, and Riyadh claimed 32-37 Iraqis killed, 35-55 wounded, and 463 captured, with 11 T-55s and 51 IFV/APCs destroyed, and 19 IFV/APCs captured.

The Iraqis attempted to send an armoured relief column, but it was stopped by a roadblock, along with Coalition air power, which together claimed 13 AFVs and 116 prisoners in exchange

for two wounded and two dead. The situation was becoming desperate and the Iraqi commander sought permission from Salah to withdraw because he was isolated, with 26th Armoured Brigade pushed back to the frontier while 15th Mechanized Brigade was beginning to collapse. Although GHQ had delegated the decision to withdraw to Salah, he feared the wrath of Saddam if he abandoned the town 'prematurely.' Salah Aboud checked with Yasin al-Maini to see whether or not there was a chance of holding the town for another day but received a negative reply. Having now received GHQ authority at 18:00, he ordered the withdrawal to begin at dusk, probably through the desert west of the blocking force, losing armour to helicopter gunships.<sup>38</sup> By 06:00 the Iraqis had reached sanctuary, but stragglers continued to come in for another four days, after which the gaps in the obstacle belt were re-filled.

The Saudis and Qataris lost 18 dead, 32 wounded, and 11 missing who later re-joined their units, two Qatari tanks, three Saudi vehicles and up to 10 Saudi Commando APCs being knocked out or destroyed. The Americans suffered 29 casualties, including two wounded and

two captured. Of their 25 dead, 11 were to friendly fire and the remainder in the shot-down Spectre. The Iraqis, who claimed to have destroyed 30 tanks and 58 APC, as well as taking 13 prisoners, later admitted 921 casualties including 66-71 dead, and 137-148 wounded, with 566-702 missing, together with 112 AFVs, 74 soft-skinned vehicles and 20 guns. Other sources put the Iraqi casualties at 60-300 dead, 400 captured and the destruction of 90 vehicles.<sup>39</sup> The Coalition later claimed, apparently based upon COMINT, that 80% of 5th Mechanized Division had been destroyed, which was clearly exaggerated, and the Iraqis claimed only 20% of the force had been lost.<sup>40</sup> On 23 February it was credited as having 145 MBTs, 207 IFV/APCs and 30 guns. The 3rd Armoured and 5th Mechanized Divisions certainly recovered, and when the Coalition ground offensive began they participated in a corps counterattack.<sup>41</sup>

The Saudis were justifiably proud that they had successfully defended their territory against a force of superior strength while, despite fratricide problems, Khafji made the Coalition believe the Iraqi Army was a hollow force of troops inferior to their enemies



Eventually, air power played a crucial role in the Battle of Khafji. Not only the jets like the F/A-18C Hornets, A-6E Intruders, and EA-6B Prowlers of the 3rd Wing US Marine Corps, visible in this photograph of their forward operating base in north-eastern Saudi Arabia, but also A-10A Thunderbolt IIs of the US Air Force smashed most of the deployed Iraqi armour. (US DoD)



Whatever was left of the Iraqi troops in the Khafji area was smashed by 406mm (16in) shells of the battleship USS *Wisconsin* (BB-64). (US DoD)

huge force across open desert in conditions of Coalition air domination would have been suicide.

Both during and after the war Saddam saw the al-Khafji operation as a strategic, operational and moral victory, and following the conflict it was described as well planned and well executed, as disrupting the Coalition's plans and fundamentally changing the direction of the war. It was especially noteworthy because it had achieved surprise despite all the Coalition's reconnaissance assets.<sup>43</sup>

and with commanders incapable of multi-division operations. It certainly encouraged Marine Expeditionary Force commander Lieutenant General Walter E. Boomer to adopt a more aggressive approach and his two divisions would attack simultaneously, while Schwarzkopf concluded that the enemy were neither as skilled nor well trained as he had been led to believe.<sup>42</sup> Yet despite everything the Iraqis claimed it was a great victory 'expelling Americans from Arab territory' and after the operation the corps and division headquarters' planning and control were highly praised, as was the flawless synchronisation among the various forces participating. Its success led GHQ to propose another operation on a larger scale, involving eight Guards divisions, pushing deeper into Saudi territory as far as Al-Mash'ab. But GHQ recognised that moving such a



## 3

## DESERT SABRE: BACKGROUND AND OVERVIEW

After a month in which the Coalition air campaign had brought death and destruction upon Iraq and its new province, and with the Iraqi missile response growing weaker, it was obvious a ground campaign was imminent. The Iraqis wished to drag the Coalition into a bloody battle of attrition and anticipated the enemy would advance on two axes; one along the coastal highway, and the other from Kuwait's south-west border along the Wadi al-Batin supported by an airborne landing on Mutlaa Ridge and an amphibious assault on Bubiyan Island. This was a fairly accurate appreciation of early Coalition planning which was dubbed 'the one-corps plan'.<sup>1</sup> By 21 January, Saddam was becoming concerned about the impact of the air campaign upon both his ability to command and control the defensive land campaign and also about the effects upon morale, although it seems likely his subordinates were shielding him from the knowledge that it was rapidly eroding.<sup>2</sup> The Iraqi decision to wreck Kuwait's oil industry precipitated the ground offensive, for in addition to setting oil rigs ablaze and spilling oil into the Gulf, the Iraqis also created more than 500 oil lakes covering a total surface area of about 35.7km<sup>2</sup>, which together with soot accumulations made large parts of eastern and south-eastern parts of Kuwait uninhabitable. The combination of oil residue with sand turned sections of the Kuwaiti desert into semi-asphalt surfaces. From the Coalition viewpoint the vandalism could not be allowed to continue unchecked.

On paper the Iraqi forces in what the Coalition described as the Kuwait Theatre of Operations (KTO) had up to 650,000 men with support troops and in fact 51 of Iraq's divisions were in, or around, the KTO. This deployment left nine divisions holding the northern frontier, three division headquarters watching the Iranians and a Guards mechanized division being formed at Baghdad. Many of these divisions had distinguished themselves in the war with Iran, and not just the Guards and the armoured forces, but also formations such as 11th Infantry Division which was now in the Gulf Headquarters. But many had been hastily assembled, sometimes with what appeared a random collection of brigades, none was more than 85% of its nominal establishment and about half were just 50%, with corresponding shortages in armour and artillery. Generous leave concessions further reduced strength, sometimes by 25%, although during the first half of January Saddam queried whether or not to revoke these concessions, but apparently decided to leave them in place to aid morale.<sup>3</sup> Apart from snatches of COMINT, Coalition intelligence was largely unaware of the situation and estimated that the KTO had 540,000 men with 4,500 tanks, 3,000 IFV/APCs, and 3,000 guns at the start of the air campaign. While it was estimated that casualties and desertions had reduced strength to 220,000 men, 1,388 MBTs and 1,152 guns, it could have been as little as 200,000 men and 550 MBTs.<sup>4</sup>

The Iraqis had turned Kuwait into a fortress with the Wadi Hafar al-Batin acting as a dry moat in the west. The coast was fortified with berms between coastal buildings, covered by armour in revetted firing platforms, while the beaches now had mines and wire entanglements. The main defensive effort faced south with a total of 15 divisions under Salah Aboud's III Corps and Aiyad Khalil Zaki's IV Corps, while the Kuwaiti and Iraqi coast was shielded by Major General Abd al-Wahid Shannan's VI Corps with 11 divisions.

Kuwait City was held by Major General Kamel Sajat Aziz's Gulf Operational Headquarters (Maqarr Amalyat Al-Khalij) with a nominal five divisions including three ad hoc Guards formations. As with the war with Iran, the Iraqi Army planned to exploit extensive defences based upon berms 3-4 metres high, revetments and ditches, and their engineers moved millions of tonnes of earth and sand to create them and to lay up to 2.5 million mines and hundreds of kilometres of wire entanglements.<sup>5</sup> The Iraqi artillery, which had proved a key element of the defence in the battles with the Iranians, and hopefully against the Coalition, tended to be deployed some 14-20 kilometres north of these defences. Oil was also to be used as a weapon, with 100 kilometres of fire trenches, although plans for a continuous trench in front of the Kuwaiti defences, the 'Tariq' Project, were abandoned in favour of shorter stretches which could be fed from nearby oil wells. Within Fortress Kuwait the defences were based upon the traditional line of earthwork battalion strongpoints made from bulldozed earth and sand, with the walls studded with bunkers. They had worked well against the Iranians but the Iraqis updated them by producing, in terrain similar to Kuwait's, a test site at Bayji near Tikrit, where the a dummy battalion strongpoint of 2.2 by 1.2 kilometres was constructed and subjected to intense air and artillery attack, which seemed to indicate that they could absorb a tremendous amount of ordnance. Indeed during the Coalition air campaign the staff of the Tawakalna Division emerged shaken but uninjured when their command post suffered a direct hit. However, this confidence was sometimes misplaced as the defences were usually built to survive 113kg (250lb) bombs but the smallest Coalition ordnance was 227kg (500lb). During January a stream of instructions poured into Kuwait from GHQ.

There were two defensive systems within Kuwait running from the Wadi Hafar al-Batin to the coast and dubbed by the Americans the 'Saddam Line.' The first ran parallel to, and 5-15 kilometres from, the border, while the second was some 20 kilometres behind this and covered the approaches to Kuwait City. Within these defences the Iraqis had dispersed their forces and protected them with both oil and conventional pyrotechnic smoke. AFVs and artillery were carefully camouflaged, the track-marks of the former carefully obliterated and under the weight of aerial bombardment guns and vehicles were carefully moved to new concealed positions and replaced with dummies or wrecked equipment. Each forward division's defences were held with two brigades forward and one in reserve while behind them, and also concealed as far as possible were the mechanized reaction forces ready to counterattack as they had against the Iranians. To the west it was impossible to provide a continuous defensive system so there was greater reliance upon battalion positions 2.5-3.5 kilometres wide and 2.3 kilometres deep, using company-size trench networks covering key axes from significant terrain. The defensive line was some 15-20 kilometres from the frontier and the divisional defences were some 15-20 kilometres deep.

Troops were warned between 6 January and 9 January to remain in their dug-outs until the enemy bombardment ceased and then to take up their positions on the firing steps, and not to be tricked into leaving by short pauses.<sup>6</sup> A more significant instruction was received on the afternoon of 20 January when GHQ ordered the forward divisions to withdraw from the border to avoid exposing forward troops and to conduct a defence in depth. Upon receiving the instructions, Salah replied that he had already done this on his own initiative from 17 January.<sup>7</sup> Underpinning the defence as GHQ's operational reserve were Major General Ibrahim Abd as-Sattar's II Corps and Major General Mahmud Faizi al-Haza's Al-



Jihad Headquarters (Maqarr Amalyat Al-Jihadi), established on 13 December, with a total of four armoured and mechanized divisions of some 33,000 men with 350 MBTs deployed on either side of the Safwan/Al-Jahra road. The Guards, still under Lieutenant General Futayyih Khalifa al-Rawi, were in strategic reserve between the Euphrates and the Kuwaiti border where they also shielded the approaches to Basra with seven divisions totalling 40,000 men with 450 MBTs.

Iraqi planning was constantly refined with the corps in Kuwaiti frequently visited by Defence Minister General Saadi Tuuma, Chief of Staff General Hussein Rashid, and their deputies, while Saddam's personal interest was displayed by periodic dabbling in deployment issues for which he was totally unqualified. The defensive weaknesses in south-western Iraq west of the Wadi al-Batin were recognised but during 1990 the only shield was Major General Ahmad Ibrahim Hamash's VII Corps. This was a somewhat slender reed, but vague reports of a Coalition build-up in this region led Saddam to call a conference on

13 January to review planning and, for the first time, to consider the possibility of a major Coalition thrust in the west penetrating deep into Iraq around Al-Bussaya and As-Salman. This led GHQ to issue new orders to both VII Corps and the Guards Corps alerting them to the threat and demanding they make preparations and plans, but Ibrahim Hamash received no substantial reinforcements. As more information arrived about Coalition activity west of the Wadi al-Batin around 23 January, GHQ feared this would herald a thrust up or along the Wadi, although as a subsidiary to the main thrust along the Kuwaiti coastal highways augmented by amphibious or heliborne assaults. As insurance, on 25 January Lieutenant General Ibrahim Ismail Muhammad's I Corps was ordered south from Kirkuk to Samawah, a move which the Iraqis claim attracted 170 air attacks in an odyssey lasting nearly a month, but it arrived relatively intact and assumed command of two divisions, two border guard commands and two SF brigades. But it still meant only nine, half-strength infantry divisions, including two ad hoc Guards formations, were holding Iraq's south-western border with probably 68,000 men, including corps troops, but only 140 MBTs.<sup>8</sup>

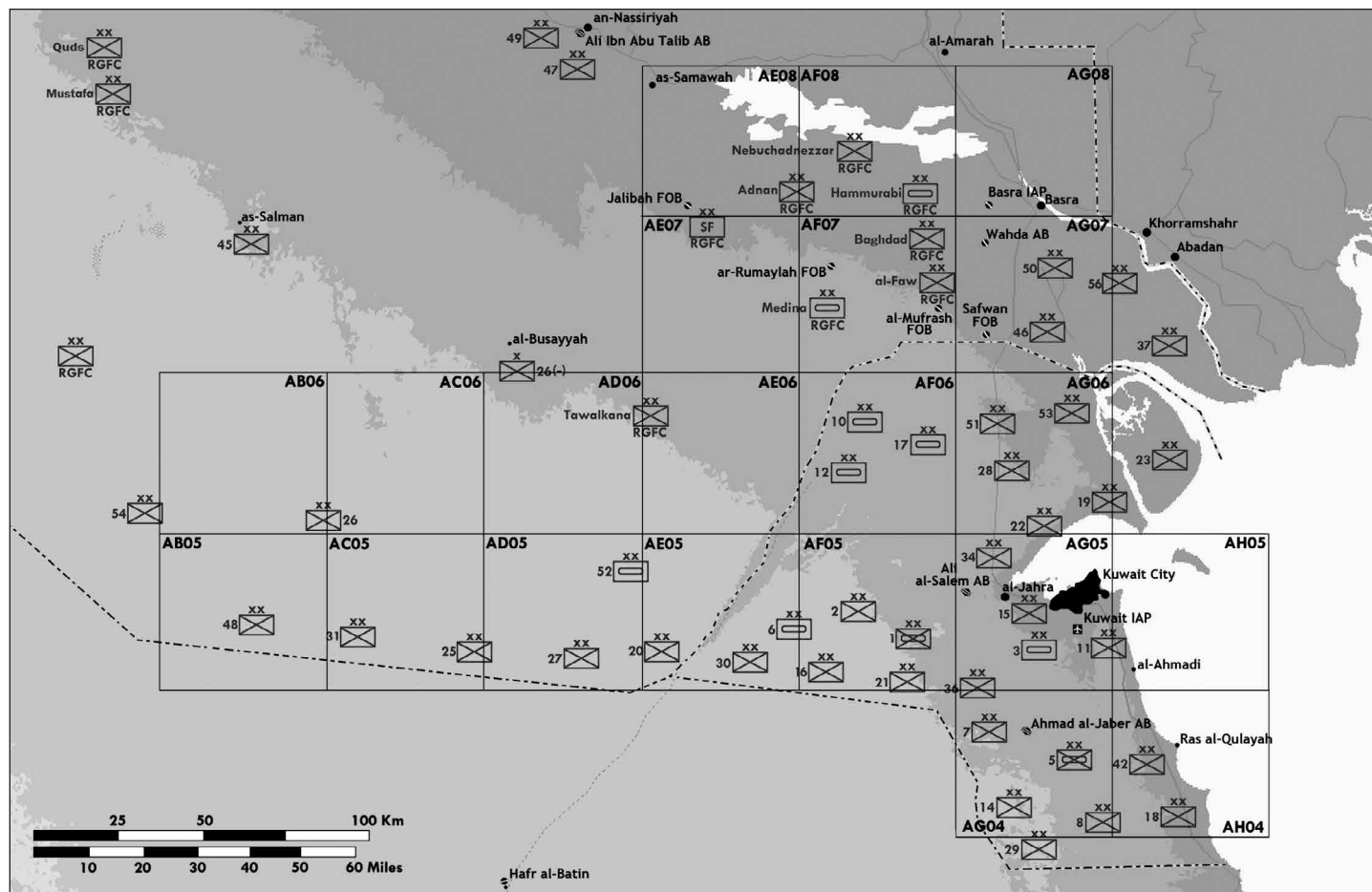
GMID grew increasingly alarmed about the scale of the Coalition build-up which they knew now, probably from COMINT, extended some 350 kilometres west of Kuwait with the bulk of the enemy armour around Hafir al-Batin, although PLO sources claimed these were mostly dummy tanks acting as decoys. By early February

**TABLE 16: SORTIES PER BOX, 17 JANUARY – 23 FEBRUARY 1991**

BOX	SORTIES (B-52)	COALITION IDENTIFIED TARGETS
AB 05	11	26th Infantry Division
AC 05	265 (22)	31st (elements), 48th Infantry Division
AC 06	132 (12)	Rear of VI Corps
AD 05	672 (32)	25th, 27th (elements), 31st Infantry Divisions
AD 06	105	Rear of VI Corps
AE 05	895 (89)	52nd Armoured (elements), 20th, 27th, 30th, 47th Infantry Divisions
AE 06	1,796 (60)	12th, 52nd Armoured, Tawakalna (elements) RGFC Division
AE 07	198 (13)	Nebuchadnezzar RGFC
AE 08	48 (8)	Communications
AF 05	1,192 (112)	6th Armoured, 16th, 21st, 31st Infantry Division
AF 06	1,694 (45)	10th, 12th (elements), 17th Armoured Division, Tawakalna (elements) RGFC Divisions
AF 07	2,880 (221)	Madina, Baghdad, Adnan (elements), Hammurabi (elements) Divisions
AF 08	196 (1)	Adnan Division
AG 04	1132 (56)	7th (elements), 14th, 29th Infantry Division, 5th Mechanized (elements)
AG 05	1,736 (48)	3rd Armoured (elements), 1st, 5th Mechanized, 7th, 11th, 15th Infantry Division
AG 06	703 (12)	Rear of II Corps
AG 07	1,379 (25)	Hammurabi, al-Faw, Adnan (elements), SF RGFC
AG 08	83	Communications
AH 04	1504 (18)	2nd, 8th, 18th, 42nd Infantry Divisions
AH 05	741 (6)	11th (elements), 19th Infantry Divisions, three SOF Brigades, 440th Brigade)
AH 06	152	51st Mechanized Division, 17th Armoured Division (elements), SF Division RGFC (elements)
AH 07	50	Rear of RGFC

they were increasingly discounting the prospects of an amphibious assault but if the alleged dummy armour around Hafa al-Batin was a decoy where would the main blow land? Unit 999 reconnaissance teams were sent in and by 12 February had confirmed the largescale assembly of forces yet GMID continued to believe this was part of a thrust up the wadi.<sup>9</sup> A startling more realistic interpretation was provided on 18 February when GMID reported the Coalition main offensive would be here with the aim of reaching the Euphrates around Nasiriyah then driving westward up the river valley and Highway 8 through Karbala to Baghdad. To meet the new threat former Chief of Staff Khazraji was recalled to the colours, putting patriotism before professional pride, to command the West Euphrates Operational Headquarters (Maqarr Amalyat Gharb al-Furat) based at Nasiriyah with two weak infantry divisions and less than 20,000 men but GMID urged the assembly of a force in the upper river to block the thrust. GHQ still did recognise the threat of envelopment to the forces in the KTO but with a ground offensive obviously imminent they withdrew most of their forward forces on the Kuwait frontier back to the 'Saddam Line' and gave responsibility for defending the Kuwaiti 'heel' to III Corps. They also blew up the desalination plant in Kuwait City, even though this was the prime source of water in Fortress Kuwait.

The Coalition air campaign saw most of the Iraqi positions come under heavy air attack, with the greatest emphasis upon the



A map showing Kuwait and southern Iraq, with the disposition of major Iraqi Army and RGFC units, and 'boxes' as designated by the Coalition. (Map by Tom Cooper)

Guards and Iraqi mechanized reserves, but the effectiveness of this campaign remains much disputed. More than 17,500 sorties were flown including 780 by B-52s, and the RGFC plus the armoured reserves suffered more than 9,800 of these, including 413 by the heavy bombers. The Coalition claimed it had eroded overall enemy strength by half and it is possible that the psychological strain of such attacks, on a scale never before encountered, led to significant desertions which, along with casualties, are reported by one source to have cut strength in the KTO from 336,000 to 220,000.<sup>10</sup> In part this was due to the disruption of Iraqi logistics which meant the distribution of supplies, noticeably food and water, was extremely uneven, with the formations furthest forward suffering disproportionately. Some idea of the confusion within Coalition intelligence about the effect of air attacks might be gained from a briefing to President Bush on 23 February with Schwarzkopf, backed by the Joint Chiefs, claiming the destruction of 1,688 MBTs, 929 IFV/APCs and 1,452 guns representing 39%, 32% and 47% of enemy strength within the KTO. The Central Intelligence Agency and the Defense Intelligence Agency were more conservative and assessed the figures respectively at 524/685 (12-16%), 245/373 (9-13%) and 255/622 (8-20%), and they were probably more accurate.<sup>11</sup>

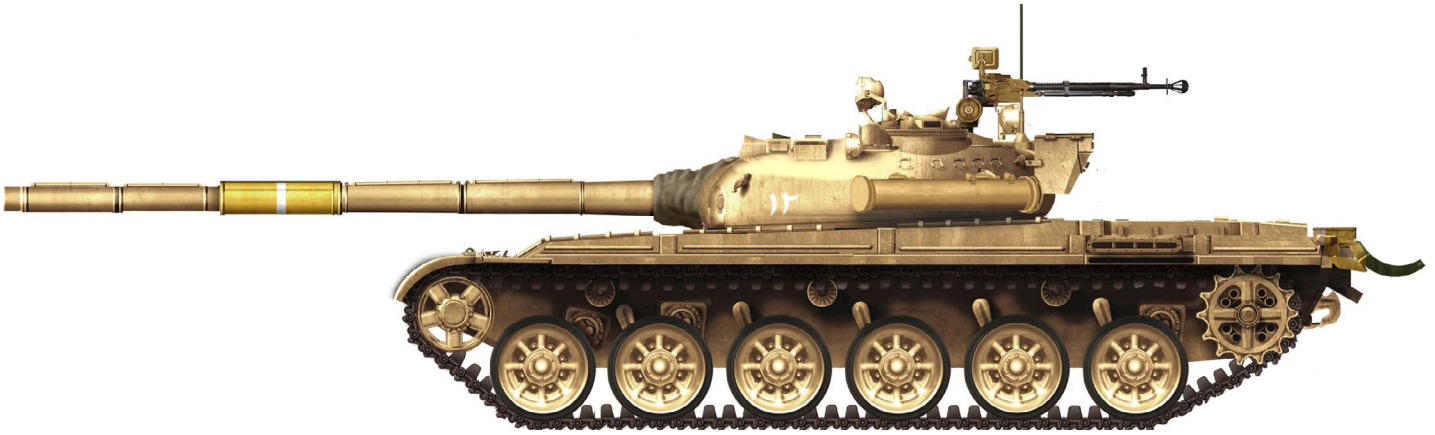
## PREPARING TO STRIKE

Even before the first American troops arrived on the Arabian Peninsula the US military leadership had been considering an offensive to drive the Iraqis out of Kuwait if diplomatic efforts failed. On 4 August Cheney ordered his military leaders to examine offensive operations to remove the Iraqis and when Schwarzkopf arrived in theatre on 25 August, he had briefed Cheney and the

Joint Chiefs on a four-phase offensive concept which concluded with a ground campaign, but the problems of assembling forces and ensuring the defence of Saudi Arabia absorbed the efforts of US Army Lieutenant General John Yeosock's staff. It was only in mid-September that active planning could begin to retake Kuwait, although the final defence plan was signed-off only on 29 November. The offensive plan debate demonstrated the old adage of 'too many cooks spoil the broth' for while in theory, military planning is straightforward, with objectives defined then resources assessed and assigned, in practice the process also involves personality clashes and can involve inter-service brawls, and this happened over Kuwait.

In part this was due to Schwarzkopf's failings. He was not a details man and he tended to express his requirements vaguely and when subordinates failed to respond in the way he wished he would explode. His prime failure was not selecting a land operations suprema so that the Army and Marine leaders, Yeosock and Boomer, had to make their own arrangements within Schwarzkopf's overall plan. It appears Schwarzkopf regarded himself as the land commander, yet it should be remembered that he was less a military leader and more on a par with an imperial legate. His prime roles were to keep together the Coalition and to assemble the resources to complete its mission, and these were very demanding.<sup>12</sup>

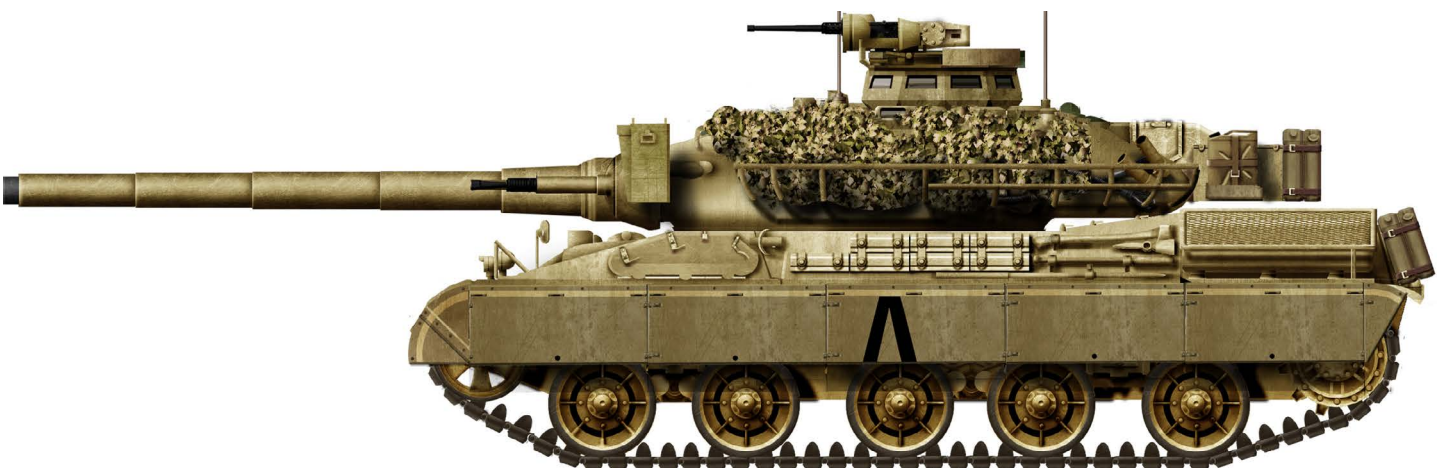
Schwarzkopf's first step was to create a planning cell whose personnel were not involved in the day-to-day preparations and four graduates from the School of Advanced Military Studies were provided by Army Chief of Staff General Carl E. Vuono. They were led by Lieutenant Colonel Joseph H. Purvis, of the Pacific Command Joint Staff, and arrived in Saudi Arabia from 16-18 September and met Schwarzkopf on 18 September. His presentation



A little over 900 T-72As and T-72M1s formed the backbone of the tank-fleet assigned to the armoured formations of the Republican Guards Forces Command of Iraq. Deployed north and northwest of Kuwait, as many as 50% of them evaded destruction during operations Desert Shield and Desert Sabre. The only Iraqi Army unit equipped with the type was the 3rd Armoured Division (the Salahaddin Force), deployed next to Kuwait City. This formation and most of its T-72s – one of which is shown here – were almost completely destroyed in the last few days of the war. As usual for 1990-1991, all the Iraqi T-72s were painted in a cardboard-like colour, bleached by the sun and rain. Note the yellow-painted fume extractor – an identification feature from the earlier war against Iran where both sides employed similar MBT types.

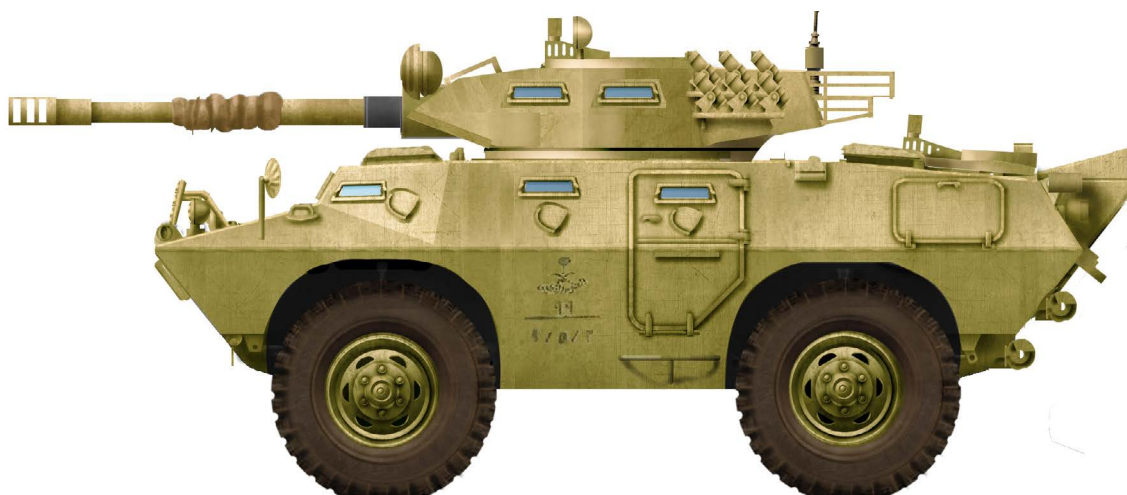


The primary main battle tank of the Iraqi Army's mechanized divisions of 1990-1991 was the T-62, 2,850 of which were acquired between 1976 and 1989. About 200 were lost during the war with Iran, while many of the survivors were subsequently modified through the addition of various local modifications, such as side-skirts and metal shrouds to protect their IR-searchlights. They saw much action inside Kuwait during Operation Desert Sabre, but proved hopelessly outmatched by superior technology, and suffered devastating losses. (Artwork by David Bocquelet)



A total of 190 French-made AMX-30Ss were acquired by the Royal Saudi Land Forces between 1973 and 1979, followed by 59 AMX-30Ds (delivered between 1975 and 1979), and 12 AMX-30Ps (1977-1979). They entered service with two mechanized brigades – one of which was entirely staffed by Pakistan Army personnel during the 1980s – and, together with 350 US-made M60A1s and A3s formed the backbone of the Saudi mechanized units as of 1990-1991. Other than the fact that they were painted in an overall sand colour, as illustrated here, very little is known about them in 1991. Slightly better known is the action of the sole Qatari tank battalion equipped 30 AMX-30Bs and 24 AMX-30B2s – also all painted in sand overall – which took part in the Battle of Khafji. Further detail of the Pakistan Army's contribution to the defence of Saudi Arabi can be found in Volume 2 of *At the Forward Edge of Battle* in the Asia@War series. (Artwork by David Bocquelet)





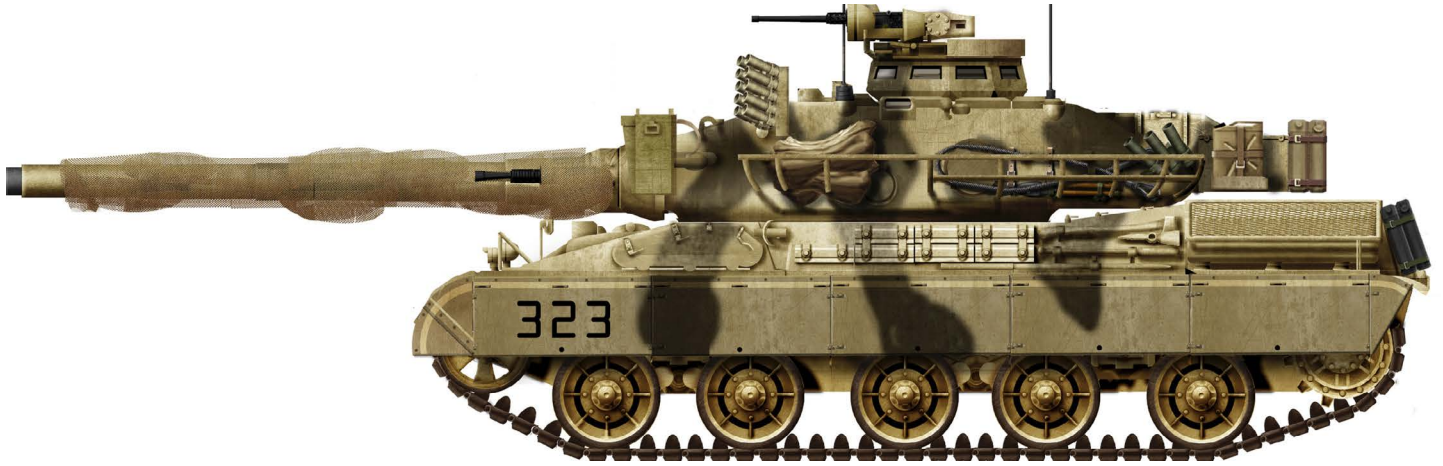
The V-150 Cadillac Gage Commando is an amphibious armoured car, manufactured in a wide range of variants with different armaments. A total of 521 were acquired by the Royal Saudi Land Forces, and 539 by the Saudi Arabian National Guard (SANG), with the latter deploying them during the Battle of Khafji. The variant shown here is armed with the Cockerill Mk 3 90mm gun and a 7.62mm co-axial machine gun and was operated by a crew of three. Other variants used by Saudi Arabia included an APC, an 81mm mortar carrier and a TOW-equipped version. As far as is known, all were painted in sand overall, and vehicles of the SANG wore the insignia of that branch, and hull numbers on their sides. (Artwork by David Bocquelet)



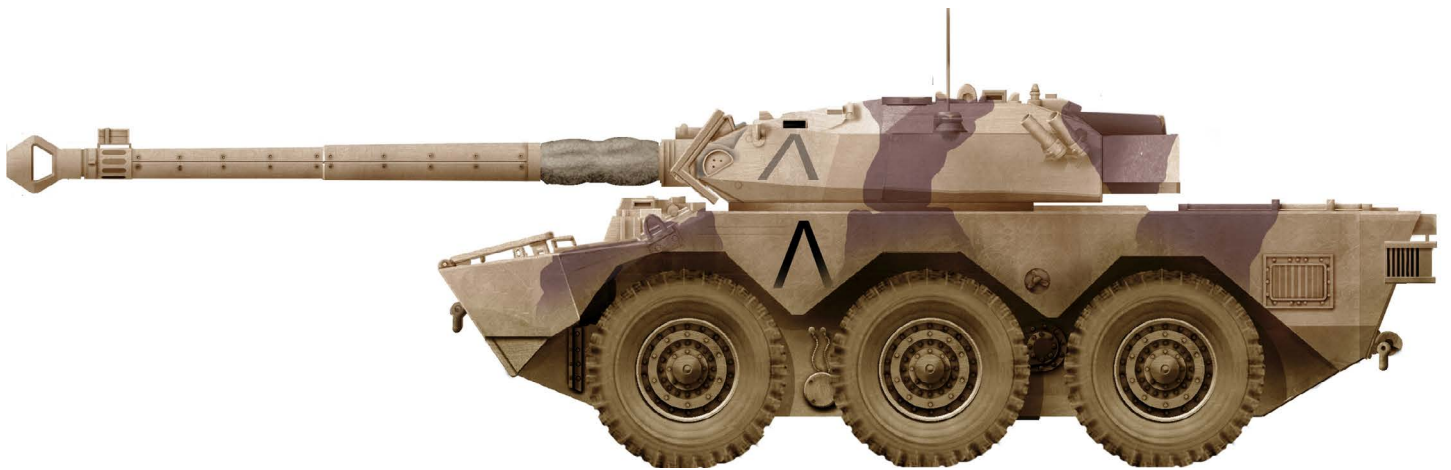
Egypt provided the – by far – biggest contingent of Arab troops involved in operations Desert Shield and Desert Storm. The 4th Armoured Division arrived in Saudi Arabia in mid-December 1990 equipped with – amongst others – M60A3 MBTs, M109 self-propelled howitzers and M113 APCs, manned by experienced and well-disciplined professionals that had regularly exercised with the Americans. All of the Egyptian M60s arrived painted as shown here, in a three-colour (sand, green and brown) camouflage pattern. Many had the right front part of their turrets decorated with a large unit insignia, in the form of a yellow eagle head (outlined black) inside a segmented black and red circle. Together with the Egyptian 3rd Mechanized Division, and US Marine Corps units, they played a crucial role in liberating Kuwait City. (Artwork by David Bocquelet)



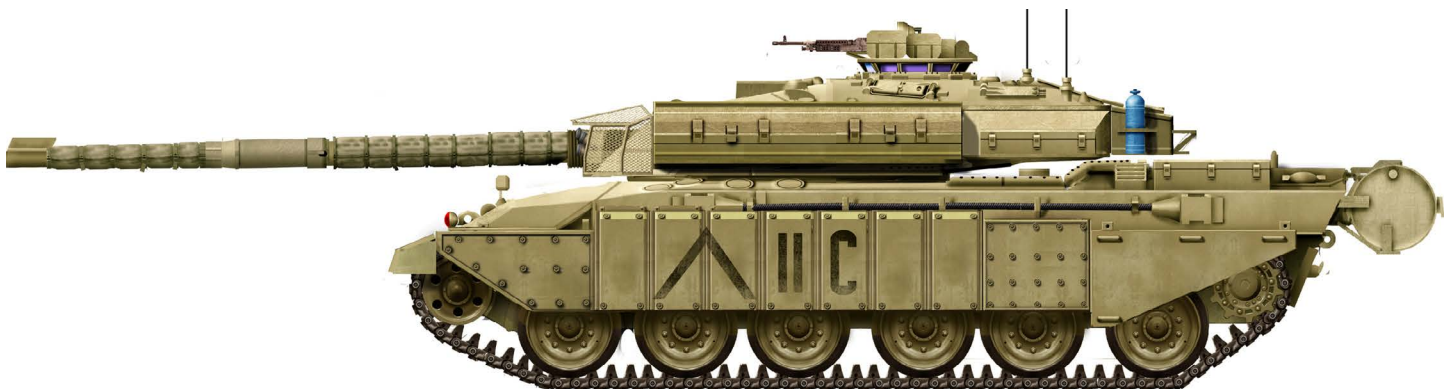
Following a delay caused by communication failure, the Egyptian 3rd Mechanized Division – equipped with 200 M60A3s and a similar number of M113A3 APCs – crossed the Red Sea and reached Saudi Arabia from September 1990. As far as is known, all of its M113s were painted as illustrated here, in sand, green and brown. Many were decorated with large unit insignia, in this case a yellow lion's head, outlined in black, and applied inside a segmented black circle. By 21 January 1991, by when the two Egyptian divisions and two logistic battalions were fully deployed in the country, their total troop strength had increased to 33,600 and eventually reached 36,000. The Egyptian Army suffered a loss of 11 troops in the war, and five killed in accidents. (Artwork by David Bocquelet)



The core of the French 6th Light Armoured Division (6e DLB) was the 4th Dragoon Regiment. Assembled from professional crews and vehicles drawn from several units, this included three squadrons with a total of 44 AMX-30B2 MBTs, and six older AMX-30Bs outfitted with Soviet-made mine-rollers acquired from ex-East German stocks. All were painted in sand overall, with wide strips of dark brown. Operating at the eastern flank of Operation Desert Sabre, as flank-protection for the US XVIII Airborne Corps, the French encountered none of the Iraqi T-72s (which were far superior in terms of armour protection). They destroyed the Iraqi 45th Infantry Division and captured the Salman FOB, knocking out 10 T-54/55 MBTs and 3 BMP-1s in the process. (Artwork by David Bocquelet)



France reacted to the Iraqi invasion of Kuwait by deploying its equivalent of the US Rapid Deployment Force: while lacking heavy armour, this was equipped with a variety of fast armoured vehicles, including GIAT AMX-10RC armoured reconnaissance vehicles, equipped with the 105mm F2 BK MECA medium-pressure gun installed in a three-man turret. Like the AMX-30B2 MBTs, during Operation Desert Sabre, they were assigned to the 6e DLB and primarily deployed as tank destroyers, rather than for reconnaissance. All were painted in sand overall, with wavy, vertical wide stripes of dark brown, and nearly all received the inverted V in black to ease their identification by allies. (Artwork by David Bocquelet)

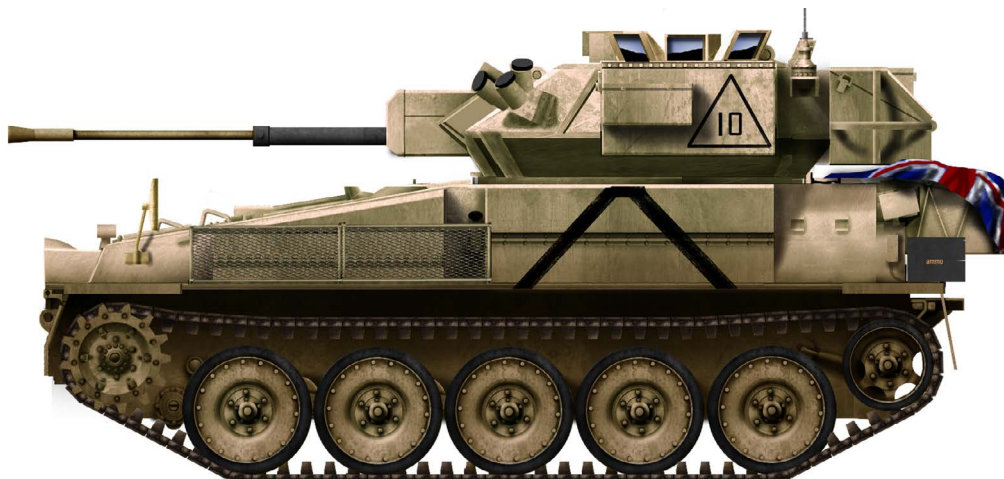


The centrepiece of the 1st (UK) Armoured Division – which operated under the VII Corps US Army during Operation Desert Storm – were the 4th and 7th Armoured Brigades. A total of over 200 FV4030/4 Challenger MBTs were deployed to the Gulf, organised into three regiments and the Armoured Delivery Group. The two brigades alternated leading the advance and within 97 hours travelled over 217 miles (350km), seeing about 48 hours of intensive combat. They destroyed five Iraqi divisions, including the 52nd Armoured, knocked out or captured over 300 MBTs and took more than 7,000 Iraqi prisoners of war – without a single Challenger lost. All the British armoured fighting vehicles were painted as shown here, in sand overall. The black chevron was applied on all vehicles, though in a variety of styles. (Artwork by David Bocquelet)

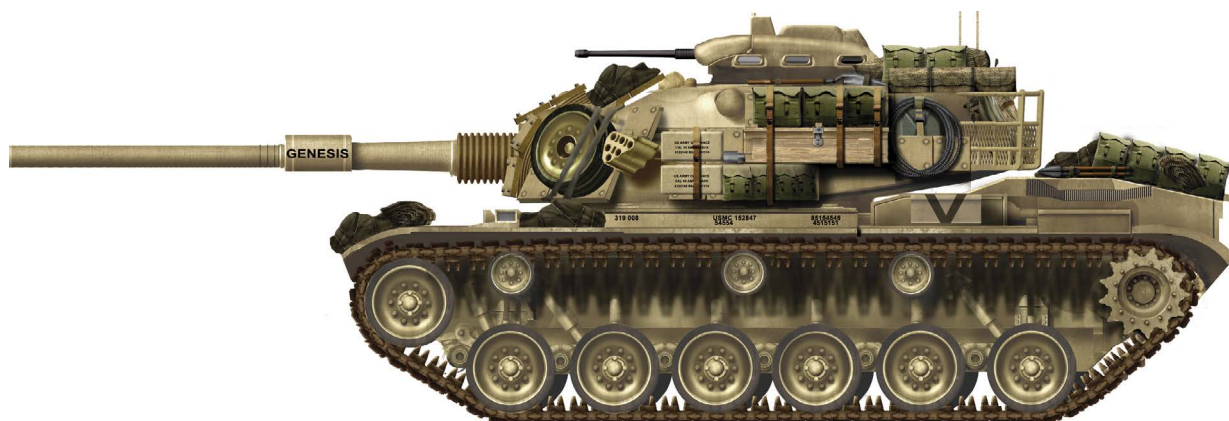




The three armoured infantry battalions of the 1st (UK) Armoured Division each had 69 FV510 Warrior infantry fighting vehicles, plus around 30 FV430-series vehicles. The battalions had received additional Warriors over and above the allocation used in BAOR, with extra vehicles used to equip the Anti-Tank Platoon and the Mortar Observation Posts, in what was known as the "Granby Establishment". Roughly comparable to the M2/M3 Bradley series of the US Army, Warriors were armed with a 30mm L21A1 Rarden cannon, and a coaxial 7.62mm chain gun. Additional Chobham armour protection for their hull sides and part of the hull front was fitted in-theatre, having been designed and manufactured at short notice under an Urgent Operational Requirement. All were painted in sand overall and had a black chevron applied as a recognition aid, while tactical insignia was usually applied on turret sides. No Warriors were knocked out in combat with the Iraqis, but two were destroyed by Fairchild A-10A Thunderbolt II close-air-support jets of the USAF, killing nine British soldiers in the Royal Regiment of Fusiliers Battlegroup. (Artwork by David Bocquelet)



Based on the design of the Alvis FV.101 Scorpion light tank, the Alvis FV.107 Scimitar was the principal armoured tracked reconnaissance vehicle of 1st (UK) Armoured Division. They were armed with the 30mm L21 Rarden cannon, as fitted to Warrior, and a coaxial 7.62mm L37A1 machine gun. Those of 16th/5th Lancers, and a squadron of the Queens Dragoon Guards, acted as an advanced screen under operational control of the Commander Royal Artillery to find deep targets for 1st (UK) Armoured Division's artillery. They clashed with Iraqi armour on a number of occasions and with the support of Striker ATGW vehicles and Challengers were able to claim a number of T-55s or T-59s. One was hit in return by an Iraqi T-59: the round passed through its thin aluminium armour, without causing injuries to the crew. (Artwork by David Bocquelet)



The M60 Patton MBT in various marks was the standard tank of the US Army and the US Marine Corps of the 1960s and 1970s. By 1990, the US Army had largely replaced it with the M1 Abrams family. Task Force Ripper of the 1st Marine Division, the unit that ran the main drive towards Kuwait City and destroyed the T-72-equipped Iraqi 3rd Armoured Division, was equipped with M60A1s: while some were equipped with add-on explosive reactive armour, many went into the battle as shown here, without this enhancement. The Marines destroyed about 250 T-55s and T-62s, and some 70 T-72s with minimal losses. While arriving in Saudi Arabia still wearing different versions of the MERDC scheme (such as Red or Grey Desert or even the Tropical), by February 1991, most of the Marines' M60s were painted in the desert tan colour overall (see below for description). As an interesting aside, the USAF's 401st TFW (P) operated two M60A3s in the EOD role at Doha in Qatar. (Artwork by David Bocquelet)

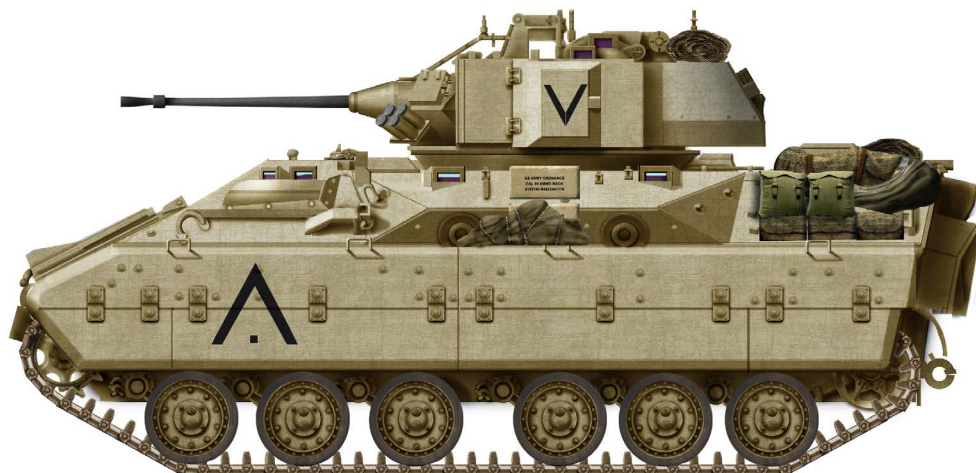




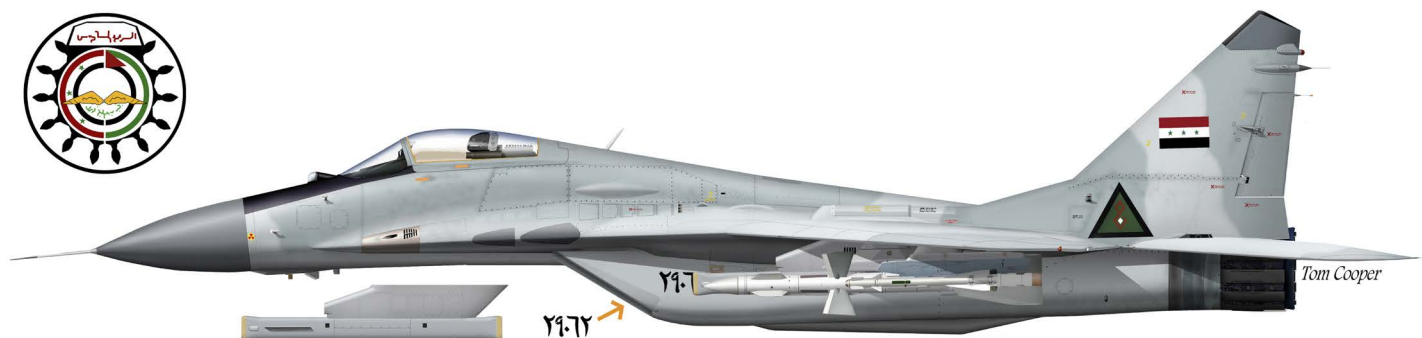
The General Dynamics Land Systems LAV-25 was an eight-wheeled amphibious armored reconnaissance vehicle used by the United States Marine Corps, developed on the basis of the Swiss-designed Mowag Piranha. The base model was equipped with the 25mm M242 chain gun, a coaxial M240C machine gun and a pintle-mounted M240B/G (both in 7.62mm NATO). At least three Light Armored Infantry Battalions, equipped with LAVs, became involved in the Battle of Khafji, when one was knocked out by friendly fire, and several damaged by the Iraqis. As usual for the conflict of 1990-91, all were over-sprayed in desert tan-coloured (FS33446) Chemical Agent Resistant Coating overall on, or shortly after, their arrival in Saudi Arabia. Some, like the example illustrated here, also received a disruptive pattern in dark brown, and by February 1991 most had large inverted Vs in black on their turrets, or at least the hull, as a means of identification. (Artwork by David Bocquelet)



The M1A1 Abrams was the primary MBT of the US Army, and also partially equipped the US Marine Corps, during Operation Desert Storm. A total of 1,848 M1A1s were deployed to Saudi Arabia. While previously untested, thanks to their night vision devices and modern rangefinders, they quickly proved vastly superior to all armour operated by the Iraqis, including Czechoslovak- and Polish-manufactured T-72s. While their 120mm main gun could knock out enemy tanks from at least as far as 2,500 metres away, their front armour proved impervious to the tank main gun ammunition available to the Iraqis: at least one is known to have survived two direct hits from an Iraqi T-72 at a range of less than 1,000m. Still, at least 23 were damaged and 9 destroyed during the fighting: 7 of the latter by friendly fire, while 2 damaged examples were intentionally destroyed to prevent them from being captured by the Iraqis. All M1A1s deployed in combat during Operation Desert Storm were painted in desert tan (FS33446) CARC colour overall, usually applied soon after their arrival in Saudi Arabia. The example shown here is fitted with a mine plough. (Artwork by David Bocquelet)



The M2A1/A2 Infantry Fighting Vehicle and M3A1/A2 Cavalry Fighting Vehicle were improved variants of the primary troop carriers of the US Army as of 1990-91. Their main armament consisted of the M242 25mm chain gun and the coaxially installed M240C 7.62mm machine gun, both installed in an electrically driven turret. Both variants carried BGM-71 TOW anti-tank guided missiles, and with these and their 25mm guns they destroyed more enemy vehicles than M1 Abrams MBTs did. In turn, some 20 were lost, including three to enemy fire, at least one by an Iraqi BMP-1 and another to a direct hit from a 120mm mortar, and 17 to friendly fire incidents, while 12 others were damaged. All the Bradleys deployed during operations Desert Shield, Desert Storm and Desert Sabre were overpainted in desert tan (FS33446) CARC colour, applied overall. (Artwork by David Bocquelet)



While the Coalition assessed the MiG-29 (Izdeliye 9.12B) as the most advanced interceptor in the Iraf's inventory, the Iraqis were dissatisfied with the type. Although originally placing an order for 137, they received only 39, starting in 1987, before taking decision to continue with purchases of Sukhoi Su-27s instead (though none of these were ever delivered). Two units with 29 operational aircraft were ready as of 1990-1991: Nos 6 and 39 Squadrons. Their aircraft were armed only with R-27R and R-60MK missiles, but none of the weapons that Western intelligence assessed as the biggest threat, such as the R-27T (IR-homing variant) or the R-73E. The example illustrated here wore the serial number 29062 and was one of several Iraqi MiG-29s modified to carry the French-made Remora ECM-pod (shown in inset). The crest in the left upper corner was the insignia of No 6 Squadron, Iraf. (Artwork by Tom Cooper)



From the Iraqi point of view, it was the 19 MiG-25PD/PDS interceptors operated by Nos 96 (crest shown in the left upper corner) and 97 Squadrons that were the most potent aircraft of this role in service. Their principal armament consisted of big and powerful R-40DT infra-red missiles (lower left corner) and R-40RD (lower centre) semi-active radar homing missiles. The Iraqi MiG-25PD/PDS could also be armed with R-60MK short-range, infra-red homing missiles, usually installed on a dual launcher under the outboard pair of R-40s. The MiG-25PD shown here, serial number 25211, is said to have scored the only aerial victory of the war for Iraq: an F/A-18C Hornet, shot down early on the morning of 17 January 1991. (Artwork by Tom Cooper)



The US Air Force deployed a total of 120 McDonnell-Douglas F-15C MSIP-II Eagle fighter-interceptors within the theatre of operations in 1990 and 1991: 28 of these were deployed at the NATO air base in Incirlik, in Turkey, while the others bore the brunt of establishing aerial dominance and then aerial superiority over southern and central Iraq. Standard armament of the time consisted of four AIM-7M Sparrow and four AIM-9M Sidewinder air-to-air missiles, with which the type scored most of the 33 kills with which it was officially credited during Operation Desert Storm. The AIM-120A AMRAAM arrived in small numbers only towards the end of the conflict. The aircraft illustrated here, FY serial 85-114, was operated by the 58th TFS, 33rd TFW – and was one of the top-scorers, with two officially credited kills. (Artwork by Tom Cooper)





Perhaps overshadowed by lighter, 'pointed-nose' fighter types, Boeing B-52 Stratofortress bombers flew 1,624 combat sorties during the war from bases as far apart as Beale in the USA, Moron in Spain, Fairford in Great Britain, Diego Garcia in the Indian Ocean and Jeddah in Saudi Arabia, to release a staggering 25,700 tonnes of high explosives – well over a third of all the bombs deployed by the Coalition during Operation Desert Storm. They primarily operated against so-called 'area targets', like air bases, troop concentrations, factories, oil refineries, storage depots, and rail yards, but also attacked minefields. They primarily employed the old M117 general purpose 750lb (375kg) bombs (visible on underwing pylons here), but also CBU-87 and CBU-89 cluster bomb units. (Artwork by Tom Cooper)



Perhaps the type most symbolic aircraft of Operation Desert Storm was the Lockheed F-117A Nighthawk. Operated by the 415th, 416th and 417th TFS of the 37th TFW, the 44 aircraft deployed during the crisis and the war, flew a total of 1,271 combat sorties. Their sole weapon were pairs of GBU-10 and GBU-27 2,000lbs (1,000kg) laser-guided bombs which were used to target high-value, heavily defended targets, such as command and control bunkers, telecommunication facilities, power plants, bridges, and hardened aircraft shelters. The type was officially credited with a hit rate of around 85%. All F-117As were painted in matt black radar absorbent colour overall and wore a bare minimum of markings. Illustrated is the jet with FY serial TF 85-0816 – which released the first bomb (even if not firing the first shot) of the war. (Artwork by Tom Cooper)



The key aircraft of Operation Desert Storm was the General Dynamics F-111F. All of the 66 deployed during the conflict were operated by the 48th TFW from Taif AB, in Saudi Arabia. The wing consisted of four squadrons: the 492nd TFS (blue fin-tips), 493rd TFS (yellow fin-tips), 494th (red) and the 495th TFS (green). F-111Fs were compatible with a wide variety of precision guided munition, most of which are shown inset below the main drawing, from left to right: GBU-12D/B (500lbs/250kg), GBU-16B/B (1,000lbs/500kg), and GBU-10E/B (2,000lbs/1,000kg). During the last night of the war, two F-111Fs deployed the specially developed GBU-28/B (4,700lbs/2,350kg) bunker-buster bombs, all of which were laser-guided. Hefty GBU-15(V)-1/B and GBU-15(V)-2/B electro-optically guided glide bombs were also deployed. Barely visible next to the ventral fin is the ALQ-131(V)-10 jamming pod, which proved indispensable for attacks on well-protected targets. (Artwork by Tom Cooper)





was basic in the extreme “Assume a ground attack will follow an air campaign...and tell me the best way to drive Iraq out of Kuwait.”<sup>13</sup> For security reasons they worked only with Schwarzkopf’s Chief-of-Staff, Marine Major General Robert B. Johnstone, his operations and plans officer, Rear Admiral Grant Sharp, and the head of the Planning Division, Colonel John Buckley.

Bitter experience in Italy in 1943-1944, Western Europe during the autumn of 1944, the Pacific, Korea and Vietnam had shown the bloody impact of frontal assaults and the understandable desire of both US military and political leaders to avoid them, but at first it was the option which had to be contemplated. The planning cell, dubbed the Jedi after the Star Wars characters, recognised the risks of a frontal assault, especially as the Coalition lacked the clear numerical superiority traditionally required in such a situation.

They concluded that they needed to halve enemy strength through air power then bypass the enemy resistance centres. This would have to be through the open Iraqi western flank with limited forces and over great distances. They felt a wide swing would expose XVIII Airborne Corps’ lines of communication. As Prince Khaled observed, American planners were determined to avoid the mistake of gradual escalation practised in Vietnam, although there was a steady trickle of sceptical press coverage about the armed forces’ capabilities. As Horner said: “We thought (in Vietnam) we could mix diplomacy with war fighting. And you can’t. Perhaps the reason we used so much force in the Gulf was that we had come to expect that we were going to fail” and added: “The new reality of war is to use overwhelming force and get it over fast.”<sup>14</sup> Or as Heinz Guderian had put it: “Don’t tap ‘em, boot ‘em.”

The Jedi’s initial study was completed by 25 September and presented to Admiral Sharp, confirming that everyone was singing from the same hymn sheet in developing the offensive and assuming air power would halve enemy strength. They informed him that limited transport and long distances made a great sweep behind the enemy unfeasible and proposed a traditional set-piece attack with a single corps concentrating overwhelming force on the enemy’s weakest point, and then infiltrate the defences to reach the Guards. Sharp agreed and the Jedi began working on single-corps options.

On 4 October following a war-game at the Dhahran AB Oasis Club to review defensive plans, Schwarzkopf asked the Airborne Corps and division commanders to consider plans for an offensive. “Not knowing exactly what (Schwarzkopf) had in mind ... [XVIII Corps commander Lieutenant General George E.] Luck instructed his subordinates to concentrate on developing lower-level plans that would apply regardless of any grand design.”<sup>15</sup> In fact the 101st Division commander had been considering air assault operations as far as Kuwait City since arriving in August.

The Jedi’s first presentation to Schwarzkopf on 6 October was a set-piece battle between the Wadi al-Batin and the sea. Flanked in the west by two Egyptian divisions, XVIII Airborne Corps would drive northeast to the Iraqi border, cutting Highway 80 and isolating most of the Iraqi forces in Kuwait. On their right would be 1 Marine Expeditionary Force (1 MEF), with the British, who would take Al-Jahra. 101st Division would provide an inner barrier while a divisional-size Saudi force would advance up the coast. All knew there would be potentially high casualties, and no-one was happy. Schwarzkopf called for an option which involved the ground offensive following a fortnight’s air offensive.<sup>16</sup>

This meant driving a gap between two infantry divisions with a third behind them, with four enemy mechanized/armoured divisions ready to counterattack. While this might by-pass the enemy strong-points it would still encounter key Iraqi ground units and, again,

everyone was unhappy, as Schwarzkopf himself indicated to his superiors in Washington. Major General Johnstone and Brigadier General Glosson were sent to present the plan to Bush, Cheney and the Joint Chiefs of Staff on 10-11 October, and while the JCS were content with the air element the CENTCOM representatives were told to develop it further and encouraged to request more resources if necessary.

Attention was increasingly focused upon the sandy desert for a number of reasons, including the reluctance of Iraqi forces to operate there. It is a common misconception that most Arabs live in the desert when in reality it is only a few thousand Bedu. The majority live either in urban conurbations of various sizes or in fertile valleys with little contact with the wasteland which makes up so much of their countries. In Iraq only truck drivers or oil construction workers had much experience of the desert, apart from the Bedu, and most Iraqis regarded the western desert as both mysterious and hostile.

They regarded it as impassable to almost all human beings because of the absence of water (despite occasional sudden deluges), the scorching summer heat in daytime and freezing temperatures at night, as well as the winter sand storms between November and April. The absence of reference points, and the fact that the sand makes for constantly changing terrain, makes navigation challenging and all of this meant that the Iraqi Army faced problems which it had never seriously contemplated. It assumed the Coalition forces would also be daunted but this ignored the high levels of peacetime training, the expertise in logistics and the availability of the Global Positioning System (GPS) and electro-optical technology, such as night vision goggles and thermal imagers, to aid navigation. The VII Corps Artillery Commander, Brigadier General Creighton W. Abrams Junior, stated: “It didn’t just tell us where we were, it did so in terrain where the other side had no idea where they were, and thought we would get lost out there.... [Before] August 1990 very few of us had ever heard of GPS.”<sup>17</sup> It is interesting to note that GPS was also used to synchronise Time-on-Target (TOT) fire missions in which artillery, rocket and even mortar fire would land simultaneously upon a target even when the weapons were fired at different times.<sup>18</sup>

When his representatives returned on 15 October Schwarzkopf instructed the Jedi to work on both two-corps and one-corps concepts and two days later the British were brought into the planning. Inevitably the planners looked beyond the boundary of the Wadi al-Batin, especially when airborne and amphibious operations were rejected as too risky of lives, the latter within a week. A second corps, which would clearly be a heavy mechanized force, provided major logistical challenges, especially the distances involved, transportation, storage, and the ability of the desert floor – about which there was little information – to support the mass movement of heavy vehicles. Planning began to focus upon using a second corps and the Jedi, CENTCOM staff and Saudi officers flew over, drove, or walked portions of the area of operations. They also assessed photographs and spoke to Bedu while Luck’s XVIII Airborne Corps did test drives of heavy vehicles northwest of Hafar al-Batin. As the plan took shape in late October, Schwarzkopf took an active role in the planning, frequently meeting the Jedi and exchanging ideas.

Options included XVIII Corps conducting a breaching operation which an armour-heavy corps would exploit or placing the mechanized corps as the outer part of the left hook, but unsuitable terrain quickly saw that plan scrapped. In the event, and apparently due to Schwarzkopf’s influence, on 21 October he was presented

with a reversal of this deployment so each corps could exploit its strengths to achieve the prime operational objective, the isolation of the Guards by what was called the Great Wheel. On the left Luck would strike deep into Iraq to control the main east-west route, Iraq's Highway 8, by cutting it west of Al-Busayyah to isolate the KTO. On his right would be Lieutenant General Frederick M. Franks' VII Corps which would conduct the main Coalition attack against the Guards whom they would envelop together with the remaining Iraqi forces in Kuwait. His axis west of the Wadi al-Batin would be to the northeast exploiting gaps in the Iraqi line and he was to defeat the Guards decisively and ensure that the remaining Iraqi forces would neither regroup nor counterattack. Once the Guards were trapped the Coalition could destroy them at leisure with air and artillery fire. Meanwhile, Arab and Marine forces would stage a frontal assault upon Fortress Kuwait with the objective of taking Al-Jahra to isolate the main force in Kuwait. A major draw-back for the plan was that the logistics build-up for the Great Wheel would have to be delayed as long as possible so the Iraqis would not anticipate it and still think the main blow would come through Kuwait. The 1st Cavalry Division had been with Luck but, given that the terrain in his sector was not really suitable for heavy armour, in early January Yeosock replaced it with the French Division and retained the cavalry as theatre reserve, to guard against an Iraqi attack on Hafr al-Batin and fix Iraqi forces in place.<sup>19</sup>

Powell received a presentation on the Great Wheel on 22-23 October and agreed to support Schwarzkopf's request for a second corps and convinced Cheney who decided that, in addition to a European-based corps, the VII or 'Jayhawk', other forces should including the 1st Infantry Division (Mechanized), three additional aircraft carrier battle groups, a battleship, the corps-size I Marine Expeditionary Force, and the 5th Marine Expeditionary Brigade (5th MEB).<sup>20</sup> On 30 October Cheney and Powell briefed Bush on the reinforcement's option, but warned they would not be available until mid-January. The following day the President formally approved the idea although delayed a public announcement for fear of adverse public reaction during the 6 November congressional elections. He made the public announcement on 8 November stating the troop increase with a call-up of both the Reserve and the Army National Guard in every state was to ensure 'an adequate offensive military option.' Three manoeuvre and two artillery brigades were called up but only the 142d (Arkansas and Oklahoma) and 196th (Tennessee, Kentucky, and West Virginia) Field Artillery Brigades were actually sent to the Arabian Peninsula. The former arriving from January 16 and the latter from 2 February.

Franks was a taciturn, highly-decorated armour specialist who had lost part of a leg in Vietnam, and VII Corps would arrive between 21 November and 13 January in Desert Shield Phase II. Its deployment offered numerous advantages because it was nearer to the Arabian Peninsula than other forces, raised total US strength to 400,000 bringing greater combat power, while accelerating the post-Cold War reduction of American forces in Europe by halving divisional strength. The prime elements were 2nd Armored Cavalry Regiment, which arrived first, followed by Major General Thomas G. Rhame's 1st Infantry Division (Mechanized), Major General Ronald H. Griffith's 1st Armored Division and Major General Paul E. Funk's 3rd Armored Division, the last from V Corps. Also sent were 3d Brigade/2d Armored Division, 7th Engineer Brigade and the 11th Aviation Brigade. The move involved 154 ship-loads with the first arriving on 5 December. Also reinforcing the Coalition were Major General Rupert Smith's 1st (UK) Armoured Division headquarters with 4th Armoured Brigade and a significant "slice" of

support troops and services, and Major General William M. Keys' 2nd Marine Division which was ordered to the Arabian Peninsula on 18 November. Reinforcements were also sent to the French division. On 14 January the 5th MEB arrived in the Gulf to augment the 4th MEB as a potential amphibious assault force.<sup>21</sup>

Coalition commanders received an outline presentation of the Great Wheel at Dhahran on 14 November although the detailed plan was not completed until 16 December. In the meantime, the planning process increased tensions with the Saudis who were excluded but aware of the American debate about an offensive.<sup>22</sup> In an effort to discover Schwarzkopf's intentions, Prince Khaled drew up a discussion paper raising matters about the strategic air campaign, action against Iraqi surface-to-surface missiles, the use of Special Forces, the air assault capabilities of XVIII Corps, and the possibility of a second front from Turkey. The document was forwarded not just to Schwarzkopf but also up the command chain to President Bush. Schwarzkopf interpreted the document as an attempt to go over his head, especially over the highly sensitive issue of Turkish involvement in the forthcoming campaign.

He summoned the prince and the two had a shouting match which ended when Sultan walked out. The following afternoon they made up, Sultan assuring Schwarzkopf he was not challenging his authority while the American blamed everything upon having a bad day.<sup>23</sup> Relations were further strained because Prince Khaled was unable to discover whether or not Damascus would join the ground offensive.

The Syrian commitment to the Coalition enterprise remained ambiguous and at the end of December Syria declined to take part in any offensive, leaving the burden upon the nervous Egyptians. Yeosock promised the Egyptians more breaching equipment and the support of the 1st Cavalry Division, which reassured them, and when the Syrians suddenly changed their mind on the eve of the ground offensive Schwarzkopf simply assigned them only rear-echelon duty, ostensibly because their Soviet-made equipment too closely resembled that of the Iraqis. In fact, Syrian artillery would support JFC-North and Syrian engineers would help breach the Iraqi defences.<sup>24</sup>

Prince Khaled was not happy when the Saudis were finally brought into the detailed planning phase. He wanted Arab forces to have the honour of liberating Kuwait yet feared taking Kuwait City might lead to prolonged and debilitating house-to-house fighting. He intended to isolate the city for a week before moving in, but felt he lacked adequate air and artillery support and wanted to be certain enemy strength would be halved by air attack. Indeed, he told Schwarzkopf he would not move an inch until his requirements were met but he also feared his men might have to fight during the fasting month of Ramadan, which was due in mid-March.<sup>25</sup>

With sufficient troops scheduled, the overall concept accepted and intelligence convinced that the Iraqis would stand and fight for Kuwait, work on a detailed ground offensive plan began in January 1991 and was now in the hands of CENTCOM through Yeosock, his operations officer, Brigadier General Steven L. Arnold, and his staff logistician, Brigadier General James W. Monroe, who had followed the process since mid-October, but the shift in responsibilities caught the component command in an awkward position. The Operations Officer, General Arnold, began planning with a special cell including the Jedi and the XVIII Airborne Corps, aided by the return of some of Holloway's Coalition Coordination Communication Integration Centre personnel and a few Army Staff planners from the United States. On 13 January, Schwarzkopf and the Coalition command approved the Combined OPLAN for



Offensive Operations to Eject Iraqi Forces from Kuwait, the field commanders receiving their copies four days later, on 17 January. The operational concept depended upon Luck and Franks isolating the Guards, and by implication, all the Iraqi forces in Fortress Kuwait, and the inherent assumption was that the defenders would stand and fight. While the enemy would certainly begin to evacuate Kuwait when the scale of threat became apparent, the Jedi assumed this would be a relatively slow affair further assuring the complete envelopment of the KTO. The whole plan was jeopardised if the Guards decided to withdraw, which would accelerate the Iraqi withdrawal from Kuwait itself, and so everything might depend upon airpower isolating the battlefield, but this in turn depended upon good flying weather.<sup>26</sup>

The VII Corps, which arrived wearing the dark green woodland uniforms designed for combat in Europe, and was the greatest concentration of armour and firepower ever assembled under a corps headquarters, was strengthened by the British 1st Armoured Division. The presence of the two corps caused command and control questions and forced ArCent to function as the higher headquarters for all US ground forces, but not the US Marines or other coalition forces. The Marines deeply resented the loss of the British armoured division and were not fully satisfied by its replacement by the Tiger Brigade from 2nd Armored Division. Franks wanted XVIII Corps to make the breach then pass through it to conserve strength for the clash with the Guards but both Schwarzkopf and VII Corps commander John J. Yeosock rejected this because XVIII Corps was not organised for a set-piece attack.

Logistics were probably the biggest problem and needed to support the movement of 255,000 troops, 64,000 vehicles and 1,323 helicopters, a distance of 226 kilometres for VII Corps and 580 kilometres for XVIII Corps. Supply lines between the corps jump-off points and the main port were up to 850 kilometres for Franks and 1,120 kilometres for Luck. To preserve secrecy, CENTCOM could not move its troops and the required 60 days of supplies west of the tri-border area until the start of the air campaign. Once this began, Yeosock's staff estimated it would have only two weeks to deploy the huge force before the start of the ground offensive, a formidable task in view of the limited number of roads and lack of vehicles to transport heavy equipment. To complicate matters, VII Corps was still arriving in Saudi Arabia after the air campaign began and needed time to acclimatise and train its troops before moving them into position for the attack.

In October the Provisional Support Command established two huge forward logistical bases code-named Bastogne and Pulaski, with perimeters as long as 8,130 kilometres, to provide critical medical support, maintenance, fuel, and ammunition. They allowed the logisticians to clear the ports, stockpile vast quantities of materiel, and improve planning for support of XVIII Airborne Corps. As it was becoming increasingly difficult to manage theatre support from Dhahran, Pagonis created the Northern Logistics Operations Centre at King Khalid Military City in November, nearer the battlefield, and at the end of the month he established three more logistical bases; Alpha, Bravo, and Delta, to support VII Corps and to provide a theatre reserve.

Each corps' role became the subject of animated discussion among ArCent and corps planners. Each corps was supposed to work out the details of its place in the overall planning concept and submit details to CENTCOM for approval. The XVIII Airborne Corps with 115,000 troops, 875 helicopters, 4,300 tracked and 21,000 wheeled vehicles repeatedly proposed plans which would enhance its role, such as a drive down the Euphrates River valley

to cut Iraqi communications. It wanted another armoured division, preferably the return of the 1st Cavalry Division, to make such a manoeuvre possible. From the start, however, Schwarzkopf and Yeosock intended to give the heavier VII Corps with 140,000 troops, 448 helicopters, 6,600 tracked and 32,000 wheeled vehicles, the primary task of destroying the Republican Guard. The main question regarding the XVIII Airborne Corps appeared to have been how that corps could support the VII Corps' mission. The planners were concerned that two corps operating in the same area would constrain each other's movements, and the VII Corps' desire that the XVIII Corps cover its left flank was rejected by Yeosock because it might leave the XVIII Corps in the kind of breaching role for which it was ill suited. So ArCent planners put XVIII Corps in a screening role west of VII Corps and in position to support the latter.

From 27-30 December CENTCOM hosted a war game to review the draft plan and resolve differences between the VII and XVIII Corps. The exercise confirmed that VII Corps should have the lead role with 1st Cavalry Division remaining in theatre reserve, but it also revealed the inherent problems in deploying the corps to their attack positions within two weeks of the start of the air campaign. During January Schwarzkopf, Yeosock and the corps planners, together with 22nd Support Command logisticians, refined the details of the offensive. Yeosock's team concentrated on developing responses for contingencies, including a counterattack by the Republican Guard and a failure to breach the defensive works along the Kuwaiti border. With Syria's decision at the end of December to stay out of the offensive, concern about the ability of the Egyptians to do their job deepened. This concern, along with nagging doubts about being able to support adequately XVIII Airborne Corps' advance to the Euphrates, caused Schwarzkopf to order a review of the entire concept. In response, ArCent planners modified some of the riskier features. They moved the base of XVIII Airborne Corps' projected northward drive to the east, nearer to VII Corps, and arranged to cut Highway 8, the key Iraqi line of retreat, with air power rather than ground forces. Although staffs revised details up to the eve of the ground offensive, the main elements were clear by February.

In addition to concerns about the Arab participation, there was friction with the Marines over boundaries and armoured support. Schwarzkopf displayed Olympian detachment leaving Yeosock and Boomer to sort out the problems. Boomer was not informed about the Jedi's activities until Schwarzkopf's plan became a fait accompli, but as a contingency he had earlier authorised his planning officer Colonel James D. Majchrzak to work on a project to liberate Kuwait City.<sup>27</sup> The Jedi's original two-corps plan had Boomer pinning down the Iraqis, but the Marine planned a more dynamic role in which he drove the enemy from Kuwait with 1st Marine Division breaching the defences, allowing 2nd Marine Division to pass through and advance to al-Jahra while 1st Division advanced on Kuwait City. But Schwarzkopf's Great Wheel removed a wheel from Boomer's waggon, as British armour was now transferred to VII Corps. Part of the reason was the British desire to use their armour in its traditional role rather than what was essentially an infantry-support role in a Marine operation, which British supremo, Sir Peter de la Billière regarded as a frontal assault to justify the Marines' post-Cold War existence and avoid budget cuts, an assault which could see heavy British casualties.

Schwarzkopf, who supported the British aim if not their reason, had been dropping heavy hints about the British departure, so when they left on 24 December it was no great surprise to Boomer, and Schwarzkopf ensured they were replaced by 1st Tiger Brigade/2nd



Colonel Daniel R Zanini of the 3rd Brigade, 2nd Armored Division, briefing his troops on the plan for attack. (US DoD)

Armored Division under Colonel John B. Sylvester. The departure of the British coincided with an inspection by the Marine Corps Commandant, General Alfred M. Gray who blamed Boomer for both the British departure and not properly employing the afloat forces. He claimed Boomer had too many hats as MEF commander and CENTCOM Marine representative, although relations between Boomer and Schwarzkopf were good, and wanted to insert a Marine command element which Schwarzkopf rejected.

Under the final plan, Operation Desert Sabre, a Marine amphibious force would demonstrate off the coast of Kuwait to divert Iraqi attention from the western flank, and amphibious exercises were ostentatiously conducted from November 1990.<sup>28</sup> Near first light on G-day, Arab forces along the coast and Marines farther inland would attack the main Iraqi fortifications and fix the enemy's tactical and operational reserves. Meanwhile, the French, the 82nd and 101st Airborne Divisions on the far left would attack north toward Baghdad and the Euphrates Valley, securing the coalition's left flank. The main attack would come on the next day. VII Corps' enormous armoured force, with the XVIII Corps' 24th Division and the 3d Armored Cavalry on the left, would break through the enemy's fortifications, drive deep into the rear, and destroy the enemy's theatre reserve, the Republican Guard. One hour after VII Corps' attack, the Egyptians and other Arab forces on the right would attack into south-western Kuwait to cover VII Corps' right flank. Between the Arabs and VII Corps, in position to support the former, the 1st Cavalry Division would feint up the

Wadi al-Batin. Following Yeosock's leadership style, the plan only sketched the initial stages of the attack, leaving later moves to be determined by his corps commanders in response to events.

Training for the offensive began as early as October with XVIII Airborne Corps testing breaching techniques and attacks on strongpoints. To create paths through minefields, anti-tank ditches, and barbed wire, the corps worked with bulldozers, mine-rollers pushed by tanks, and portable bridges. They also practiced with the mine clearing line charge (MICLIC), a rocket-launched cable carrying a line of charges that, when fired across a minefield, exploded mines in its path. Training against the 82nd Division's model of an Iraqi defensive system, one battalion matched each of its two assault companies with a bulldozer, MICLIC, and antitank platoon. The companies crossed the path created by these devices and attacked a triangular position at about the same time that friendly air and artillery fire shifted to supporting triangles. After engineers opened holes in the sand berm wall with dynamite and plastic explosives, the two companies burst through the breach and fanned out into the trenches. Meanwhile, the battalion's third company manoeuvred by the flank to block reinforcements from adjacent positions. In the end, these well-publicised exercises probably proved more valuable as decoys for the Iraqis than as preparation for the actual mission, but at the time no one could be sure of the 82nd's eventual role. XVIII Corps' training priorities shifted to manoeuvre warfare and force modernisation during December and early January.<sup>29</sup>

VII Corps created two life-size models of Iraqi trenches for training in breaching techniques. The division experimented against these mock-ups and came up with a tactic that took advantage of the shifting desert sands and eliminated the need for troops to leave their armoured vehicles to eject an entrenched enemy. The technique required plough-equipped tanks and armoured combat earthmovers (ACEs) to turn along the trench lines after breaking through them. Then, while Bradley crews alongside poured cannon and machine-gun fire into the trenches, one tank or ACE moving along the front lip and the other along the rear filled in the trenches with their ploughs. If ever employed, this tactic could be expected to cause panic among the enemy while neutralising his defensive works. Troops who arrived in the Arabian Peninsula were thoroughly trained. VII and XVIII Corps built elaborate models of the Iraqi defences, the latter building a complete battalion strongpoint which all units scheduled to participate in breaching operations trained on. The 1st Infantry Division had begun testing breaching operations in Fort Riley and the National Training Centre before it deployed and built a 5-kilometre-wide replica of the Iraqi trench systems with fighting positions, bunkers and revetments. VII Corps conducted a grand dress rehearsal using its 250 kilometre move to test the Great Wheel manoeuvre and move to meet Guards armoured forces, rehearsals being completed by 18 February.<sup>30</sup>

The beginning of the air campaign saw the VII and XVIII Corps begin moving westward to their new jump-off positions. Thousands of vehicles carried their supplies both directly to formations and to the new bases and they were augmented by the USAF's C-130 force's labours of Hercules. By the end of January flights carrying most of XVIII Corps troops from King Fahd IAP were landing at Rafha every seven minutes and once the troops were in place they moved supplies, indeed they were crucial moving critical supplies and key personnel as well as more than 3,000 tonnes of aviation fuel.<sup>31</sup>

One problem was the desert weather, which did not normally lend itself to military operations, but during January and February 1991 was among the worse for many years and the Coalition advance



through the desert began in rain. The poor weather helped to cover the Coalition movement and both corps were in place when the ground offensive began on 24 February. The most serious problems were medical emergencies: the French Division Commander Major General Jean-Charles Mouscardès had come under US command on 16 January but on 7 February he was evacuated for medical treatment and was relieved by Brigadier Bernard Janvier; while less than a fortnight later, on 19 February, Yeosock had to be evacuated for an operation in Germany and was temporarily replaced by his Operations chief Lieutenant General Calvin A.H. Waller. The tough Yeosock returned to lead his troops some 10 days later.<sup>32</sup> There is an interesting comment by one writer that Yeosock "... though a competent staff officer ... was not cut out to command the two corps ... a fact of which almost everyone in Central Command and the Army was aware" and he also appeared scared of Schwarzkopf's temper.<sup>33</sup>

The Great Wheel would swing through an area some 350 kilometres wide and 250 kilometres deep bounded on the right by the Wadi al-Batin, along whose western edges were sabkhas some 30 kilometres deep. Sloping gently from some 1,000 metres to sea level in the Euphrates valley it was mostly a huge stony and sandy plain cut by numerous wadis, the rocks being a threat both to rubber track pads and tyres. The western half, through which XVIII Corps would advance, included a plateau and numerous rocky outcrops while marshes extending up to 50 kilometres to the south covered the approaches to the middle Euphrates between As-Samawah and An-Nasiriyah and surrounded both towns. The rocky terrain gradually became a mixture of sand and gravel towards the east and then gave way to featureless sandy desert. This in turn led to oilfields in an area 75 kilometres wide south of Basra down to the Kuwaiti border which provided considerable cover from oil wells, gas and oil separation plants, pumping stations and numerous levies, some carrying roads. The winter weather meant that the Coalition forces could expect to advance through both rain and sandstorms lasting hours at a time, the talcum-fine silica cutting visibility and proving a hazard to both man and machine. Certainly, the Iraqis considered it impassable to large bodies of troops, rather like the Allies' view of the Ardennes in the winter of 1939/1940 and 1944/1945.

From the moment the Coalition air campaign began the Iraqi frontline came under pressure with raids not only by infantry but also by artillery, the latter becoming more intense from 13 February when 27 MLRS launched 216 rockets, which delivered some 140,000 bomblets onto Iraqi gun positions which were under observation by an AN/TPQ-37 Firefinder E/F (formerly S-band) 2-4 GHz counter-battery radar linked to an MLRS system. There was no reaction by the Iraqi forces.<sup>34</sup> The biggest raid was by VII Corps on the night of 16-17 February when five battalions supported by Apache helicopters engaged Iraqi air defence batteries and opened a 2-kilometre-wide corridor. Coalition artillery planning displayed limited originality but proved extremely efficient due to significant technical developments in the previous three decades. It would prove as significant an element in the victory as the mechanized forces, with one commentator observing:

The scale of the success was largely attributable to the fact that most of the Coalition forces involved had been specifically equipped and configured for this style of conventional operation and had personnel of high quality and training. The NATO contingents of the Coalition had trained intensively and at great expense for forty years to match a first-class adversary. The Iraqi Army was a dangerous opponent, but hardly the Coalition's peer.

It possessed years of recent battlefield experience but suffered the misfortune to have spent those years shaping itself to win against an enemy, Iran, whose approach was often characterized by primitive human-wave tactics.<sup>35</sup>

From the very start of the ground offensive bombardments were 'prolonged, heavy, and of unprecedented precision eroding both physical strength and morale.'<sup>36</sup>

From 21 February Coalition raids began to turn into probes. While the offensive began in rain at 04:00 on 24 February, to the relief of Coalition leaders clearer weather soon appeared. The fronts will be considered separately in following chapter but what follows is an overview of the ground campaign.<sup>37</sup> In part it was executed despite a lastminute effort by the dying Soviet Union to broker a peace-deal based upon the Iraqi withdrawal from Kuwait within six weeks. Saddam accepted Moscow's proposals and President Bush might have followed suit. However, Iraqi commanders were setting ablaze Kuwaiti oil wells to protect their troops from air attack following earlier destruction in the oilfields on Saddam's orders and the release of oil into the sea. This was interpreted as a deliberate attempt to sabotage the Kuwaiti economy and encouraged the ground offensive.

## 24 FEBRUARY

The Coalition ground offensive achieved total surprise, but it rapidly began to unravel due to the failures of both Schwarzkopf and Yeosock. The sheer complexity of Desert Sabre meant that in accordance with doctrine, they both delegated the execution of the mission to their subordinates at corps level and retained a co-ordinating role using the vast range of modern communications technology. But as the German military philosopher Major General Carl von Clausewitz famously observed that 'no plan survives contact with the enemy' and as they realised that enemy resistance was lighter than expected, within hours they began tinkering with the plan, although they regarded it as a sin of flexibility. Unfortunately, their Olympian detachment in Riyadh some 400 kilometres from the front, along with the fact that the two men had separate headquarters in the centre and the outskirts of the city, and the obvious inadequacy of their planning meant there were serious consequences. As Scales pointed out: "... changing the basic plan would mean shifting gears in a machine with more than 300,000 moving parts. Simply sticking to the plan was easier; changing it at the last minute was infinitely more difficult."<sup>38</sup> His decision was driven by COMINT showing confusion and disarray between the Iraqi II and IV Corps in Fortress Kuwait together with data from JSTARS, yet while he consulted Yeosock and Luck he rarely contacted Franks directly, the latter's input only later requested by Yeosock, as to whether they could accelerate their advance.

Neither Schwarzkopf nor Yeosock appear to have comprehended the impact of their decision to accelerate the offensive and although they had liaison officers as their eyes and ears at each corps they failed to understand the problems their loyal subordinates faced in their fickle interference, sometimes described as 'riding herd', and it is reported that Schwarzkopf's deputy, Lieutenant General Calvin A.H. Waller, encouraged this interference.<sup>39</sup> This especially applied to the VII Corps commander, Franks, who was expected to trash his original operational plan, bring forward his advance some 15 hours then push forward at high speed across difficult terrain and in difficult environmental and meteorological conditions. The British division, for example, had to abandon plans to bring up their armour in low-loaders and instead drive 100 kilometres on their

tracks, while the fuel tankers which had been positioned simply to top up the low-loaders now had to rush back to base so they could refuel the empty tanks of the AFVs.<sup>40</sup> When Franks failed to act as the new Guderian, Schwarzkopf railed against him as he was only vaguely aware of his problems. It is one thing to hear of rough terrain and poor visibility, it is another to experience it, and while instant communication was theoretically possible with so many participants there was too much room for misunderstanding. As the Jayhawk Corps chronicler, Stephen A. Bourque, observed: "All too soon the reality of conditions on the ground, inclement weather, the dynamics of combat, fatigue, and combat service support problems were subordinated to the illusion portrayed by the location of a unit sticker on the map."<sup>41</sup> He notes that neither Schwarzkopf nor Yeosock, nor even any senior staff officer made the two-hour flight to meet Franks at his tactical headquarters which might have prevented confusion exacerbated by communications technical problems, while it is also claimed that Schwarzkopf spoke to Franks directly only once.<sup>42</sup> To paraphrase the words of the early 19th century British Premier George Canning: "Modern communications can immediately tell you everything you wish to know...except the truth." Ironically, the military management techniques applied from Riyadh had echoes of Washington's micro-management during the Indochina War, a policy lately widely condemned by the US Armed Forces and, indeed, one they sought to by-pass in the post-Vietnam world.

What was especially galling for Schwarzkopf was the rapid progress of Luck's XVIII Airborne Corps compared with that of Franks, but Luck faced light opposition and was able to insert a heliborne force 150 kilometres behind the Iraqi lines to cut Highway 8 while his armoured forces moved swiftly to advance some 80 kilometres. From the start Franks faced supply problems which restricted his advance, and his progress was noticeably slower than his neighbour in the west, advancing only 25 kilometres. The Marines under Boomer made excellent progress advancing some 30 kilometres and were paced by the Arab task force on their right, but that on their left moved forward at a glacial pace which compromised any hopes that they might participate in the envelopment of Fortress Kuwait.<sup>43</sup>

Before dawn the Iraqi GHQ received reports of unusually heavy Coalition activity, but this was interpreted as merely a continuation of the patrol and raid activity of previous weeks, possibly to increase political pressure and certainly General Ibrahim Ismail Muhammad's I Corps seemed unconcerned. But as the sun rose it illuminated an extremely alarming situation with all the Fortress Kuwait commanders reporting that they were facing a major offensive, which was especially stunning for Saddam who at that very moment was negotiating the withdrawal agreement with the Coalition through Moscow. During the day Saddam became increasingly confused by the torrent of reports reaching him and like a drowning man clutched at any straws which would provide comfort; VII Corps was reporting light activity while Fortress Kuwait reported a successful defence. Saddam convinced himself that the attacks in the west were designed to undermine the defence of Fortress Kuwait by drawing out the defenders. Although one of his more astute officers recognised the potential threat to the Guards and recommended withdrawing some troops from Kuwait, Saddam decided to wait and see.<sup>44</sup> However III Corps was authorised to withdraw north through Kuwait City to avoid envelopment. In fact, GHQ had lost all touch with reality as the whole Iraqi defensive philosophy collapsed as the infantry who should have held the line collapsed. Days of unprecedented aerial bombardment had not only disrupted supplies to forward positions but eroded morale and when

faced with the reality of the Coalition assault the majority quickly surrendered.

Ignoring the growing chaos behind him, Rawi quickly focused upon the potential threat from the west and assumed tactical command of General Mahmud Faizi al-Haza's Al-Jihad Headquarters and ordered 12th Armoured Division to send its two armoured brigades westward to shield the Guards from positions which he had already reconnoitred. Simultaneously Rawi began to shield the approaches to Basra by re-organising his forces for defence in depth around the Wadi al-Batin, exploiting a rearward slope using the Tawakalna and Adnan Divisions, and this activity helped confuse Coalition intelligence which briefly lost track of some Iraqi armour.<sup>45</sup>

## 25 FEBRUARY

Despite this confusion Luck was confidentially informed during the early morning that the Iraqis would not counterattack, which must have been extremely reassuring. He pressed on 100 kilometres to Al-Busayyah, which fell at dawn, but at the end of the day began to encounter forward elements of the Guards Corps.<sup>46</sup> On his left, Luck consolidated his hold despite heavy rain on Highway 8, while his mechanized forces advanced some 135 kilometres. On his right the Marines and Arabs pushed slowly into Fortress Kuwait, with the former fighting off counterattacks and then engaging an enemy reserve while well supported by the Saudis on their right, but less so by the powerful Arab troops on their left who continued to drag their cloaks.

Schwarzkopf could see the imminent disintegration of the Iraqi forces but also recognised that he was not yet in position to envelop them, hence his profound frustration, especially when inaccurate information showed that Franks had moved backward. The fact that Luck's mechanized forces were making spectacular progress of up to 95 kilometres showed up Franks' apparent shortcomings, yet to avoid interfering in the chain of command he rarely tried to speak to Franks directly, preferring to give that task to Yeosock. He would later observe: "I began to feel I as if I were trying to drive a wagon pulled by racehorses and mules."<sup>47</sup> Matters were not helped when he promised President Bush in a telephone conversation there would be a big battle between Franks and the RFGC come the morn, and was then informed by Yeosock an hour later that the Jayhawks' spearhead was still 30 kilometres behind Luck's armour.<sup>48</sup>

During the day the magnitude of the Iraqi collapse began to dawn upon Saddam and GHQ. Salah Aboud, having earlier reported defensive successes by III Corps, now admitted that he was retreating through Kuwait City and that he had suffered substantial losses. Thoughts of a bastion around Basra now began to grow in GHQ and in anticipation of this the Deputy Chief-of-Staff, Lieutenant General Sultan Hasim, met the planning director, Major General Khalid Hussein, and the operations director, Major General Najib Awad, to plan a withdrawal. These discussions were intercepted by Coalition COMINT. They talked to almost all the corps commanders, apart from Salah Aboud and General Kamel Sajet Aziz's Gulf Operational Headquarters, both in Kuwait City, warning them to prepare for a phased withdrawal with the first phase that night by Kamel Sajet Aziz and Salah Aboud, together with marine and air defence forces on Faylakah Island. The second phase would be on the night of 26-27 February shielded by the Guards and would involve the remaining corps in Kuwait as well as VII Corps. It was planned to send written orders by road, but the liaison officers were unable to get through. The chaos was further increased because at 20:30 Saddam telephoned Army Chief-of-Staff





M1A1 Abrams MBTs of the 1st Armored Division advancing into southern Iraq, on 25 February 1991. (US DoD)

Lieutenant General Hussein Rashid Muhammad in his forward headquarters near Basra and personally ordered a withdrawal, with units destroying all military equipment which could not be brought back. The troops were to be redeployed to a new line from as-Samawah through an-Nasiriyah and al-Qurna to Basra. Saddam assured him written orders would follow in the morning, but in the absence of any detailed instructions General Hussein was left in limbo. However, anticipating political upheaval, the Guards' garrisons in Baghdad and Basra were strengthened which would allow Saddam to retain control of southern Iraq in the post-Desert Sabre world.<sup>49</sup> One unexpected benefit for the Iraqis was that the Americans, to reduce the threat of friendly fire incidents, tightly restricted their helicopter gunships to the vicinity of the corps, allowing the retreating Iraqi columns a modicum of security while even with the excuse of poor weather, fixed-wing airpower failed to cut the score of bridges and causeways which led to the sanctuary around Basra.

## 26 FEBRUARY

What was becoming an Iraqi rout from Kuwait accelerated when Baghdad Radio announced at 01:00 that Iraq had accepted UN Resolution 660 and would withdraw its forces from Kuwait.

Schwarzkopf heard this 75 minutes later and in a brief conversation with General Powell was informed that a ceasefire would soon be declared.<sup>50</sup> Unaware that the RGFC and Iraqi armoured forces shielding the escape from the KTO were far stronger than his intelligence claimed, he tried to chivvy Franks into wheeling eastwards sooner than planned and gave him two more divisions which merely compounded the Jayhawks' logistical problems. He called upon Yeosock and said: "Light a fire under VII Corps" and repeated this demand in different terms at noon when Powell confirmed the Iraqis were seeking a ceasefire.<sup>51</sup> Yet he appears to have made little effort to contact Franks directly and they do not appear to have spoken until the afternoon when the corps commander telephoned him. By contrast he contacted Luck to demand the sealing of the Euphrates valley and to this end there was a plan to despatch a heliborne force to block the escape routes to Basra. A major problem for Franks was that Schwarzkopf's staff appears to have had only the vaguest knowledge of Franks' problems and actions and Yeosock actually believed he was happy with Franks when in fact he was considering relieving him.<sup>52</sup>

Franks was justifiably sceptical of claims that the RGFC was weak but steadily regrouped to begin assaulting their positions, although in doing so he created a gap between him and Luck.



A Challenger MBT of the 1st (UK) Armoured Division seen while undergoing maintenance. The principle armoured regiments deployed to the Gulf were The Royal Scots Dragoon Guards and The Queen's Royal Irish Hussars in 7th Armoured Brigade, and 14th/20th King's Hussars, augmented by a squadron from The Life Guards, in 4th Armoured Brigade. Men and vehicles were drawn from many other regiments of the Royal Armoured Corps to bring 1st (UK) Armoured Division up to strength. (US DoD)



A CVR(T) Scimitar of 9/12th Royal Lancers (Prince of Wales) of the Armoured Delivery Group. The crews had been advised to 'help themselves' to ammunition stores, and did so quite liberally, collecting items that were not normally issued to Scimitar crews – such as hand grenades (lower right foreground), and LAW-80/94 anti-tank weapons. (Major Phil Watson)



The Centurion AVRE (Armoured Vehicle Royal Engineers) was based on a family of vehicles that first entered service with the British Army shortly after the conclusion of the Second World War in Europe, and were thus referred to as 'The Antiques Roadshow' (after a popular BBC TV programme). The AVREs were armed with a 165mm Demolition Gun that fired high-explosive squash head projectiles out to a range of 1,000 metres and was designed to destroy bunkers or finish off partially-successful demolitions of other structures. Their armour was improved through the addition of ERA-blocks for service in the Gulf. Several AVREs were lost due to engine fires, but none suffered combat damage from enemy action. (Major Phil Watson)

During the evening the long-awaited clash of armour, known as 73 Easting, began and throughout the night Franks' troops triumphed, allowing him to continue eastward. By contrast, Luck was not living up to his name as his attempts to help isolate the KTO encountered severe logistical problems and strong resistance. On Frank's right Boomer's Marines and the Saudi task force reached the outskirts of Kuwait City and the Egyptians managed to advance some 60 kilometres but it was too late for them to envelop the enemy.

For the Iraqi troops fleeing Kuwait, the Baghdad Radio announcement was the first formal acknowledgement that they were quitting Kuwait. But their commanders still lacked detailed plans while communications between Basra and the KTO headquarters had almost collapsed, with the Iraqis suspicious that any which survived were compromised. Some officers were not at their posts, while staff officers trying to bring up written orders had to run the gauntlet of Coalition air power which killed several of them. Upon being briefed on withdrawal plans one unidentified corps commander 'could not believe this was really happening', while formations were already disintegrating under the impact of the Coalition advance and air attacks. There were also contradictory orders including Saddam informing corps that they must now defend specific cities. At 07:00 Saddam sent personal commands to corps commanders to evacuate equipment and wounded, then a few hours later ordered equipment destroyed. At 11:45 Lieutenant General Sultan modified the withdrawal plan following feed-back into his forward headquarters and now IV, VI and VII Corps were to withdraw first, supported by III, Jihad and Guards Corps. The remaining corps were to begin withdrawing the next day but during the afternoon there was much confusion, aggravated by breakdowns in communications, and by midnight Rawi was admitting he could not hold the Americans and ordered the unengaged units north to defend the approaches to Basra. Most of the remaining RGFC succeeded in escaping along with a third of their AFVs.<sup>53</sup>

Coalition discussions about sealing off the area focused upon the pre-war bridges and roads, but Iraqi engineers had created some 20 temporary bridges and causeways, many across the Haw al-Hammar, of which Coalition intelligence had no knowledge, providing an extremely flexible means of moving both south and north. The Iraqis had also pre-positioned numerous pontoons, tactical bridging systems and even barges which could be used as ad hoc pontoon bridges, making the transport system even more robust.

## 27 FEBRUARY

Washington made no decision about the ceasefire as the Great Wheel was threatening to come off because of growing supply problems at a time when both men and machine were feeling the effects of three days of continuous operations. Consequently, Luck and



Franks advanced some 25 kilometres but were in no condition to envelop the Iraqis from the north and they were content to harass the Guards. The politicians were now seeking to close-down operations, partly because Kuwait had been liberated, and partly because the continued slaughter of Iraqi troops would produce a backlash in the Arab world. Yeosock wanted to continue until the Coalition had a military decisive effect but at 22:30 Powell telephoned Schwarzkopf from the White House and informed him that the president's advisors, together with the British and French leaders, were worried about the destruction of Arab forces and he asked whether or not Schwarzkopf objected to an end to the war. Schwarzkopf recognised the political realities and agreed to a recommendation that President Bush announce a cessation of hostilities in 6½ hours and immediately warned his subordinates of his intention. Powell rang later to say the conflict would end at 05:00 local time to ensure it would be known as the '100-hour' land offensive, but Bush decided to end it three hours later.<sup>54</sup>

Schwarzkopf clearly realised he no longer had the option of sealing off the theatre and forcing Iraq to leave most of its heavy military equipment behind. While his intelligence organisation claimed the RGFC were surrounded and their only option was surrender, it was actually confusing the corps with various elements of it, which were indeed trapped. He consoled himself with the knowledge that the air offensive had destroyed a large amount of the Iraqi equipment. In fact, when Rawi recognised that he had been decisively trounced he ordered the RGFC to withdraw immediately to defend Iraq, and the Iraqis were able to exploit the gap between Luck and Franks.

During the day a major dispute arose between the ground and air forces which had an impact upon the campaign. A Fire Support Co-ordination Line (FSCL) had always existed to limit the risk of attacks upon friendly forces, with all sorties within the line under positive control of ground or forward air observers, while beyond it the airmen had carte blanche. As the troops approached the Euphrates, the US Army commanders, notably Luck, unilaterally pushed the FSCL north of the Euphrates and close to Basra, in his case to clear the way for his heliborne assault. This meant that only Forward Air Controllers (FACs) could control missions harassing the Iraqi withdrawal across the marshes and lakes of Hawr al-Hammar but most of the FACs on 27 February were committed to supporting operations within Kuwait, and even if they were available the weather conditions were unfavourable. The airmen appealed to Schwarzkopf to pull the FSCL back to the Euphrates, but it took 15 hours to resolve the dispute during which the retreating Iraqis were subject only to Apache raids and not the full weight of Coalition firepower.<sup>55</sup>

The political decisions put a great deal of pressure on the Coalition ground forces to complete the destruction of the Iraqi forces. Luck managed to get closer to Basra, securing his left along the Euphrates, and with Franks' support advanced 50 kilometres along Highway 8. He planned a heliborne insertion north of Basra and along the causeways across the Hawr al-Hammar marsh, but this was cancelled overnight because of the imminent ceasefire. Franks also pushed eastwards and overcame RGFC resistance on the so-called Madina Ridge and cut the Basra-Kuwait City Highway, but these actions delayed his plans for further manoeuvre as well as creating logistical problems. Nevertheless, by the time the ceasefire took effect the Coalition controlled the area south of the Euphrates.

On 'the other side of the hill' Saddam spent the early part of the day trying to establish some form of control over the 'withdrawal' ordering the advanced headquarters in Basra to establish a defensive

line along the city's suburbs but to be ready for a battle within its streets. The RGFC, who reported growing pressure from the west, together with 10th Armoured Division were to hold the line of al-Qurna to Basra to the az-Zubayr bridge, with VI Corps south and south-west of Basra while II Corps would be west of Basra from the airport to the ash-Shuaibawith 51st Infantry Division in the town of as-Zubayr. To the west of the Coalition enclave III Corps would hold the an-Nasiriyah area and IV Corps were to hold the area around as-Samawah, orders which clearly indicated how out-of-touch he and GHQ were with reality; both corps had disintegrated in the great withdrawal from Kuwait. Saddam was better informed about Iraq's internal situation where growing signs of unrest, notably among the Kurds to the north and the Shia to the south, led him to use the two ad hoc corps from Fortress Kuwait to co-ordinate internal security, the Gulf Headquarters around al-Kut and the Jihad Headquarters in 'the southern operational zone', while VII Corps was to relieve I Corps which was, in turn, to return to Kirkuk.<sup>56</sup>

## 28 FEBRUARY

Following his conversation with Powell, Schwarzkopf had alerted his subordinates to the fact that the ceasefire would take effect at 05:00 local time but then Powell rang to inform him this had been changed to 08:00 causing considerable confusion as Schwarzkopf and his staff had to inform their commanders of the change and try to exploit their three-hour 'bonus'.<sup>57</sup> Washington's micro-management had again affected operations – just as during the Vietnam War – and there was now little to do except consolidate. Luck pushed ahead until he was only 48 kilometres from Basra, having cut the final escape routes. Franks wanted to complete the destruction of the RGFC but Schwarzkopf, who continued to over-estimate the effect of Coalition air power upon the Guards, wanted him to take Safwan where he would hold ceasefire talks. As usual, he relayed the order through Yeosock who failed to convey his commander's intentions, leaving Franks under the impression that he was merely to take the junction south of the town, which he did. When he learned of Franks' 'failure' this further irritated Schwarzkopf and he ordered the seizure of the airfield at Safwan and the nearby hills. Iraqi troops were ordered to move but, justifiably pointed out that the ceasefire was in place and these were their positions at the time. The Americans ignored them, and the Iraqis recognised that discretion was the better part of valour and permitted themselves to be shepherded northwards.<sup>58</sup>

During the morning, Iraqi GHQ received many reports of heliborne operations and while these were true for al-Jalibah and Tallil ABs most were false: nevertheless, they finally made the Iraqi leadership recognise the full scale of the disaster. Troops were still seeking to escape from Kuwait and exploiting the numerous bridges and causeways over Hawr al-Hammar but they were frequently clashing with American blocking forces, with the Hammurabi Division suffering badly. Yet the Coalition's cease-fire proposals were interpreted as being offered because the attackers had suffered heavy losses from the RGFC shield, and believing honour satisfied Saddam accepted the proposals. Once the proposals were accepted Saddam ordered his corps headquarters to return to their peace-time stations but then there were alarming reports of popular uprisings in part stimulated by disgruntled units which had reached sanctuary.<sup>59</sup> While the Iraqis had certainly lost much equipment in Kuwait they had also managed to extract a great deal, although intelligence was unable to determine how much. Satellite imagery as early as 1 March detected a large armoured concentration some 100 kilometres north of Basra. These forces would help security units crush the rebellions

with great brutality over the coming months as the Coalition merely watched and wrung its hands.

Coalition losses were relatively light with the Americans suffering 293 dead (145 in accidents and 35 to friendly fire) while the remainder of the Coalition suffered 94 dead, although it is worth noting only 190 Coalition troops died due to enemy action and a high number, including nine British Army dead, were to 'friendly fire' which accounted for nearly a quarter of US casualties. In addition 776 were wounded including 458 American. They were so light that many Arab military observers are extremely sceptical about them but in part this reflected the superior quality of Coalition equipment, especially American. This was demonstrated by the fact that of 1,995 Abrams MBTs only four were disabled, while another four were damaged but repairable – and none of their crews were killed – while of 2,200 Bradleys only three were disabled.

Iraqi casualties are more difficult to count but careful research suggests that the Iraqi armed forces suffered 20,000 to 26,000 dead while 3,500 civilians also perished. A report estimated that 9,000 troops died during the air campaign and that the Coalition ground offensive killed an estimated 8,000–10,500.<sup>60</sup> Assuming that there were three wounded for every dead this might put total Iraqi military casualties at 104,000 or a third of the troops in the KTO. Iraqi equipment losses are also more difficult to ascertain but the CIA estimated that of 2,655 MBTs in the KTO, 842 had survived together with 1,412 out of 2,624 IFV/APCs and 279 out of 889 guns.<sup>61</sup> The Iraqi defeat demonstrated that good troops can be defeated through bad leadership and the Coalition offensive action in the air and on the ground underlined Saddam's inadequacies. His chaotic thinking meant that there was no firm strategic basis for Iraqi ground operations and confused both the Iraqi Army and his own elite Republican Guards. His last-minute decision to withdraw from Kuwait reduced the situation to chaos and rout, to complement the surer Coalition command and control.

## 4

## THE LEFT HOOK – XVIII CORPS

The Great Wheel would travel through south-western Iraq, an area of some 168,000 square kilometres of rocky and sandy desert no more than 400 metres above sea level and split into the rocky western Al-Hajarah with wadis, ridges and depressions and the sandy eastern Al-Dibdibah which has a covering of scrub vegetation. The whole Coalition campaign depended upon Luck's XVIII Airborne Corps with 117,000 troops, of whom 107,300 were American, supported by 758 MBTs, 4,300 AFVs including 567 M2/3 Bradleys, and 56 M551 Sheridans, 444 guns, 63 MLRS, 18 ATACMs, 287 attack and 801 support helicopters together with 21,000 wheeled vehicles. Luck was to push 260 kilometres north, then northeast to cut the Iraqi Highway 8, initially with heliborne and then mechanized forces, before sweeping eastwards to provide the outer layer of the forces isolating both the RGFC and the Fortress Kuwait garrison.<sup>1</sup>

To secure his left Luck would send Brigadier General Bernard Janvier's light French division, supported by the truck-borne 2nd Brigade/82nd Airborne Division, 145 kilometres inside Iraq up the narrow, dirt road designated Main Supply Route (MSR) Texas to the small town of As-Salman (Objective White) with its nearby airfield. Another dirt road ran east from As-Salman towards the village of Al-Busayyah, and as the French drove up MSR Texas, Major General J. H. Binford Peay's 101st Airborne Division would send a heliborne force to a site just south of where this road is met by a third dirt road from the south (MSR Virginia), and there establish Forward Operating Base (FOB) Cobra for its attack helicopters, from which to reach Highway 8 in Area of Operations (AO) Eagle. On Luck's right, his main strike force, Major General Barry R. McCaffrey's 24th Infantry Division (Mechanized) with the 3rd Armored Cavalry Regiment, would drive across the desert first north then swinging north-eastwards to reach Highway 8 and drive down it. It would first reach the Salman-Busayyah road (Objectives Brown, Grey and

Red) and then swing eastwards to Objective Gold, south of Tallil Air Base (AB), and Battle Positions (BP) 101,103 and 104 as jump-off points across the sabkhas to reach Highway 8.<sup>2</sup>

Luck faced only weak Iraqi forces, indeed only on 25 January did Lieutenant General Ibrahim Ismail Muhammad's I Corps receive orders to transfer from Kirkuk to As-Samawah, where Highway 8 crossed the Euphrates, to command the sector opposite XVIII Airborne Corps. The move was made under continual Coalition air attack and by the time it arrived the troops' morale could not have been high.<sup>3</sup> Only the left brigade of 45th Infantry Division, with a tank company, was actually facing Luck, holding a position 50 kilometres inside Iraq south of As-Salaman, dubbed by



General Schwarzkopf (left), with Lieutenant-General Gary Luck, commander of XVIII Airborne Corps, seen after Operation Desert Storm at Rahfa Airport. (US DoD)





A direct comparison of two attack helicopter concepts: visible to the left is an Iraqi Mi-25 (export variant of the Mil Mi-24), captured in Kuwait, and to the right an AH-64 Apache of the 1st Cavalry Division, US Army. (US DoD)



An AH-64A Apache attack helicopter assigned to XVIII Airborne Corps, US Army, seen just before taking off for a combat sortie during Operation Desert Storm, armed with 16 AGM-114 Hellfire anti-tank guided missiles. (US DoD)

Janvier Objective Rochambeau. The corps' other formation, 54th Infantry Division, was around Nukhaib, 280 kilometres northwest of As-Salam. On the Euphrates itself was the recently formed West Euphrates Operational Headquarters at An-Nasiriyah under former Army Chief-of-Staff Lieutenant General Nizar Abd al-Karim al-Khazraji with 47th and 49th Infantry Divisions, while further up the river at An-Najaf were the newly formed al-Quds and Mustafa Guards Infantry Divisions, both severely under strength. In reserve, the corps had 54th Armoured Brigade and the corps commando brigade, but total Iraqi strength opposite Luck was probably under 50,000 men.<sup>4</sup>

## 24 FEBRUARY

Luck's 'eyes' were three Special Forces' teams forming the Long Range Surveillance Detachment, which were inserted from before dusk until seven minutes after midnight. Before dawn they had all been detected either by Iraqi security forces or the local Bedu and requested extraction, which was completed by 17:05 at the cost of one wounded. Shallower, but more conventional reconnaissance was conducted by scout platoons of McCaffrey's 24th Infantry Division operating up to seven kilometres inside Iraq.

The previous day, Major General James H. Johnson's 82nd Airborne Division, 'The All Americans', and Janvier's French Division had taken the border berms through which the engineers would cut breaches for the remainder of the corps to pass. The rim of the Great Wheel began to move at 04:00 on 24 February,

led by Janvier who had 9,860 men, 44 AMX-30B2 MBTs and 18 guns, supported by 120 helicopters including 60 Gazelles in the attack role.<sup>5</sup> The French crossed the border at 07:30 and advanced north with two brigade groups abreast, Groupement Est and Ouest, supported by the American 18th Field Artillery Brigade and followed by the 82nd Airborne Division's brigade in trucks, with an American engineer battalion improving the road.<sup>6</sup>

The advance was unopposed, but sandstorms and rain slowed progress and the stony terrain ripped numerous tyres of the wheeled vehicles. As the French approached Rochambeau in the early afternoon they came under light Iraqi artillery fire which was soon neutralised by the American artillery aided by Firefinder counter-battery radars. The French then engaged Rochambeau and together with their Gazelle attack helicopters before it fell to an assault led by tanks of the 4ème Régiment de Dragons of Groupement Est which, at a cost of 27 casualties, including two dead, took some 2,500

prisoners, the town being secured by 14:30. A major problem for the French was the traffic jam building up on the narrow road behind them due to American support forces which hindered the movement of French artillery, engineers and logistics. At Janvier's request Luck temporarily closed MSR Texas to American forces, giving the French a breathing space which allowed them to defeat an Iraqi tank company, but at dusk the French were still some distance from As-Salam and Janvier decided to halt, despite pleas by Luck and Schwarzkopf, leaving the 1st Brigade/82nd Division to mop up along MSR Texas. In part this was due to the fact that Janvier's night vision equipment was inferior to that of the American's and he also feared sleep-walking into a minefield. His decision seemed confirmed around dusk, 18:00, when a sandstorm developed further reducing visibility.

Weather, specifically fog, also disrupted Peay's initial operation to seize FOB Cobra causing him to delay the main heliborne assault of 101st Airborne Division, initially until 07:00 and then an hour later. However, pathfinders were able to take off and were inserted at 06:50 to secure the landing zone and at 07:27 the first of 60 Blackhawks, each carrying 14-16 troops, and 40 Chinooks carrying vehicles and howitzers, took off as the division's gunners pounded enemy positions to ensure they landed unopposed at Cobra at 08:15. The troops quickly spread out to secure the 24-kilometre diameter site by 10:39, then Cobras and USAF Warthogs helped the troops take a nearby strongpoint with 340 prisoners, including a 49th Infantry Division battalion commander.





Two AMX-30 MBTs of the French division seen during a break in the advance, outside as-Salman. The AMX-30 was considered too lightly armoured and poorly equipped for 1991, and the French Army was forced to scrape up all the best vehicles and professional troops from multiple units for deployment to Saudi Arabia. (US DoD)



An Iraqi early warning radar station knocked out during the French advance. (US DoD)

Behind them engineers began improving an ancient dirt pilgrim's trail as MSR Newmarket and a large supply convoy of some 700 vehicles set out at 10:00 towards Cobra where it arrived around dusk.<sup>7</sup> Meanwhile some 60 Chinook sorties brought in supplies for initial operations and at 13:30 Apaches began to lift off and head north to interdict Highway 8, Area of Operations (AO) Eagle, and to search for potential landing sites.

Peay had planned to deploy Colonel Robert Clark's 3rd Brigade across Highway 8 almost immediately but the weather made this impossible and with pessimistic weather forecasts for the two forthcoming days he warned Clark to be ready to move early the next morning, and to secure Cobra he flew in his 2nd Brigade. Just after dusk, and despite rain and high winds, a scout platoon team were inserted 80 kilometres to the north near Highway 8 in AO Eagle to find a landing zone, which it did only 10 kilometres west of their insertion site. Meanwhile, Chinooks continued to bring fuel into Cobra despite the bad weather and by morning some 100 sorties had brought in some 2,500 tonnes of aviation fuel, sufficient for 1,300 hours of attack helicopter operations which were augmented by a

further 4,800 tonnes brought in by land.

Luck's big club was McCaffrey's 24th Infantry Division (Mechanized) with 3rd Armored Cavalry Regiment, the two being scheduled to deploy as the corps' second echelon although they had secured the frontier berms and driven breaches in them. But at 09:10 Schwarzkopf warned Luck that the two should begin their attack at noon, confirming this 50 minutes later, and they jumped off at 15:00. With Schwarzkopf upping the tempo, the division – with 26,000 troops, 249 Abrams MBTs and 1,061 IFV/APCs, 114 self-propelled artillery

pieces, 9 MLRS, 90 helicopters including 27 attack, and 7,800 vehicles – began to move out ahead of schedule heading across the Sahra al-Hajarah (Desert of Stone), a high, rocky desert with sharp stones and boulders, making for the eastern section of Highway 8. The division advanced in line abreast on a 70-kilometre front with (west-to-east) Colonel Ted Reid's 197th Brigade, 1st and Colonel Paul Kern's 2nd Brigades with 3rd Cavalry, in 'leaps' of some 65 kilometres at 25 km/h. Most brigades had two mechanized infantry battalion battle groups in the lead, with a tank battalion behind them, with each battalion in box formation 6.5-8 kilometres wide and 25-35 kilometres deep, with the battalion commander and his soft-skinned support vehicles within the 'wagon train'. The divisional cavalry maintained a screen of Bradleys and Hummers some 8-16 kilometres head of the main front. Behind them the 36th Engineer Group created MSR Virginia with paths for each brigade to ensure that the division would receive its daily requirement of more than 10,000 tonnes of fuel, water, ammunition and food.

In the absence of any IrAF response, due to the success of the Coalition air campaign, McCaffrey had advanced some 45 kilometres





An Iraqi T-54/55 MBT knocked out during the advance of the French 6th Light Armoured Division. (US DoD)



Burning Iraqi vehicles marked the north-bound advance of the 24th Infantry Division, US Army, which was to end only in the southern outskirts of an-Nasiriyah. (US DoD)



UH-60s of the 82nd Airborne Division at a forward operating base, south of the border with Iraq. (US DoD)

into Iraq and now reduced his front. He transferred Colonel John M. LeMoynes's 1st Brigade behind Colonel Paul J. Kern's 2nd Brigade as it advanced upon Objective Grey, just to the left of Objective Brown to which Colonel Edward Reid's 197th Brigade was advancing. By taking these two objectives McCaffrey hoped to create a gap into which he could insert LeMoynes who would then advance 50 kilometres. At 03:00 on 25 February, 197th Infantry Brigade attacked Objective Brown following a bombardment by 72 guns and 27 MLRS and then air support. At 13:00 2nd Brigade, also with heavy artillery support, hit Objective Gray opening the way for LeMoynes who entered open desert changing gradually into a series of narrowing, shallow valleys. By 21:30, having met little significant opposition, McCaffrey had advanced 120 kilometres and Luck assessed 48th Infantry Division and those elements of 45th Infantry Division facing him as no longer effective.

Here, and in VII Corps, to aid command and control as well as to help protect against friendly fire, vehicles carried Budd Lights. Named after Henry C. 'Budd' Croley of the US Army Materiel Command, they consisted of infrared light-emitting pulsing diodes placed on vehicle antennas in varying numbers to distinguish command or guide vehicles from others. Easily visible through night vision goggles at distances of up to 2 kilometres, the purplish glow allowed units to move through the night with a high degree of security, although vehicles were also marked inverted V's in reflective infrared paint.

## 25 FEBRUARY

On the left the French, having reorganised during the night using GPS receivers, resumed their advance at 04:00 and seven hours later approached

As-Salman airfield which now came under air attack. Despite poor visibility the French approached the town and the airfield, beginning their attack upon the former at 13:00 and at 14:00 began their assault upon the latter with artillery and helicopter support, including a rolling barrage. The assault upon the airfield was led by 4e Dragons and within half-an-hour it was in French hands, while the town was surrounded by 17:26 and then stormed within 50 minutes. Mopping up took longer and the town was not secured until 09:20 the following day as a brigade of the 'All Americans' helped to secure the area and to place a total of 2,000 men of 45th Infantry Division into prison camps as Janvier's troops established a secure western flank for XVIII Airborne Corps.<sup>8</sup> However, in the next few days the French and their allies would suffer a trickle of casualties from booby-traps and mines, an American engineer company suffering seven dead in an explosion at the air base on 26 February.

Coalition COMINT determined that the Iraqi forces ahead of Luck were in chaos and that he would not face any counterattacks, and this encouraged him to use his forces aggressively. Peay's hopes of inserting Clark into AO Eagle on Highway 8 were initially frustrated by rain and wind during the morning, although this did not stop his helicopter and truck companies bringing in 2nd Brigade to Cobra by 07:20. During the mid-morning the weather improved, and as the first step to cutting Highway 8 at 11:02 60 Chinooks lifted Task Force Rakkasan with TOW-equipped Humvees of the division's anti-armour battalion, a field artillery battalion and various wheeled vehicles to Landing Zone Sand southeast of Al-Kinder, a few miles north of Tallil AB and west of An-Nasiriyah. They landed 79 minutes later and began driving northwards through the mud and sand to AO Eagle where they arrived the following day. By the early afternoon the weather had settled sufficiently for Peay's main operation and at 14:00 the 3rd Brigade, including an artillery battalion and attached attack helicopter units, took off in 66 Blackhawks and completed the 280-kilometre flight to AO Eagle at 16:40. An hour earlier other helicopters had carried some 500 infantry to secure LZ Sand while 2nd Brigade had assembled at Cobra.<sup>9</sup>

To the south, McCaffrey continued his advance during the night to approach his first set of objectives, codenamed (west-to-east) Brown and Grey, with Objective Red to the north of Grey, a battalion command post, all under the 49th Infantry Division sector. The 197th Brigade struck Brown after a two-hour advance following air and artillery preparation which left the defenders dazed. The objective was secured with 31 prisoners by 07:00 to open the way for MSR Virginia and allow LeMoyné's 1st Brigade to drive on to Red which it approached from the west and reached at 09:00, while the 2nd Brigade masked Grey which was taken against little opposition, with 300 prisoners, at 14:00. Red was attacked at the same time but took four hours to secure with 200 prisoners. With their rear secure the three brigades drove eastwards towards three new objectives of Objective Gold, as well as BPs 101, 102 and 104, around an area of sabkhas (salt flats) some 25 kilometres south of the Euphrates and extending some 35 kilometres. Much of it turned into quagmires due to nearly 24 hours of rain and marked 'the great dismal bog' on USAF survival maps. BP 101 was just south of Tallil AB, on the northern edge of the 'bog', BP 102 was 25 kilometres south of An-Nasiriyah on Highway 8, BP 103 was the eastern exit to the 'bog' while BP 104 was just south of Jalibah Airfield. The easiest approaches to the bog were down wadis with 50-metre cliffs. During the night the divisional cavalry squadron found routes down them and through the bog, which the engineers improved, so that by 23:00 the brigades had secured jump-off positions.

## 26 FEBRUARY

Despite heavy rain which impeded air and ground operations, the 3rd Brigade of the 101st Airborne Division continued to interdict enemy forces along Highway 8, destroying 15 vehicles and capturing 37 Iraqi POWs in the early morning alone, and by the afternoon an entire attack helicopter battalion was operating along the highway watched by 47th Infantry Division to the west around An-Nasiriyah.

The main battle was to the south where McCaffrey was given tactical command of 3rd Cavalry at noon. The morning brought a further problem as an out-of-season shamal wind kicked up thick clouds of swirling dust in the objective area and severely restricted helicopter operations, but the brigades used the time to refuel.

McCaffrey's original plan was to temporarily halt south of the Euphrates so he could bring up his logistics 'tail' before pressing on to cut Highway 8 and secure the surrounding area (Objective Gold) but fearing the Guards might exploit the situation he pressed on. By noon on 26 February, he planned for Reid's 197th Brigade to seize BP 101 while Kern's 2nd Brigade would seize BP 103 and then turn east to attack toward BP 104. As McCaffrey's main effort, the 1st Brigade would stay in the lead to take BP 102 and cut Highway 8 but at noon the 3rd Cavalry set out to take Qalib al-Luhays airfield, 25 kilometres southwest of what the Coalition called Jaliba FOB, which it took by 16:00.<sup>10</sup> To the north Iraqi Commandos of the 26th Guards Commando Brigade were deployed near Ali Ibin Abu Talib AB near Nasiriyah while the battered 49th Infantry Division was trying to hold the Objective Gold area buttressed by the Nebuchadnezzar and Adnan Guards Infantry Divisions shielding the approaches to a narrow, 2.5 kilometre-long, causeway over the eastern Hawr al-Hammar which led due north to a point 15 kilometres from al-Qurnah and the main highway down the Tigris from Baghdad to Basra.<sup>11</sup>

The three brigades set off north at 14:00 through rain and sandstorms on an overcast day. LeMoyné's 1st Brigade went north, then east about 65 kilometres to take a battle position in the northeast corner of the corps sector. It was the first to reach its objective, BP102, and despite a 30-minute artillery preparation encountered fierce resistance including artillery fire. They fired heavily but against pre-selected targets marked by 55-gallon drums, which the Americans avoided while their counter-battery radars located enemy batteries and directed volleys of M483 Dual-Purpose Improved Conventional Munitions (DPICM) to silence the Iraqi guns.<sup>12</sup> As the corps advanced into the Euphrates Valley the gunners were ordered not to waste fire on anything less than a battalion. The divisional artillery supported the spearhead while the corps batteries struck targets deep in the enemy rear.<sup>13</sup> Meanwhile a tank battalion crossed and blocked Highway 8 and began shelling vehicles of a brigade from the Hammurabi Guards Armoured Division which was trying to withdraw to Baghdad, but by 01:10 on 27 February BP 102 was secure. This involved heavy fighting in which LeMoyné faced four-hours of tank and artillery fire. For the first time the terrain gave the enemy an advantage because they were dug-in to rocky escarpments. American gunners used their Firefinder radars to locate enemy batteries and returned up to six rounds for every incoming round to destroy six artillery battalions. The Iraqis returned little more than pre-planned fire at the previously mentioned pre-positioned oil barrels.

In the tank battles American technological advantages, notably thermal imaging systems, allowed tank and attack helicopter crews to engage enemy armour at ranges up to 3.5-4 kilometres. Iraqi tanks often suffered catastrophic explosions which blew off their turrets, demoralising the infantry who left vehicles and bunkers



with their hands raised in surrender. McCaffrey's men claimed 54 tanks following their initial contact with the enemy, then infantry supported by artillery, MLRS, and Mk19 grenade launchers attacked enemy bunkers and defences.

Kern's 2nd Brigade moved 55 kilometres north to a position along the eastern corps boundary and then continued its advance another 40 kilometres until it was only 25 kilometres south of Jaliba. They encountered minimal resistance and took BP 103 by 18:00 and then prepared to attack Jalibah. Reid's 197th Brigade struggled through difficult terrain northeast for about 95 kilometres to a position just south of Tallil and as they emerged from the 'bog' at 22:00 they were ambushed by 3/26th Guards Commando Brigade, but the US M113s drove through the ambush site. The brigade gradually emerged from the 'bog' to strike BP 101 and after a fierce battle the objective was secure by midnight, while Gold itself was secure by 02:10 as Luck prepared to establish FOB Viper southwest of Jalibah airfield.

By midnight the corps noted a flood of Iraqi vehicles over the Hawr al-Hammar causeway which was subsequently attacked and the flow stopped. By late evening on the 26th, McCaffrey's lead elements stood on Highway 8 while the division tail stretched 300 kilometres back to the original tactical assembly area. Enemy vehicles blundered into Highway 8 roadblocks, including 54 tank-transporters each with a T-72, and enemy material losses in and around Orange were assessed the following morning at 58 tanks, 85 other vehicles, 100 guns and 200 prisoners.

This was important because the drive through the 'bog' had needed so many twists, turns, and diversions that fuel was running low. Temporary logistics bases were established behind the brigades but the first division support area, DSA-1, was 100 kilometres from the border. As the brigades advanced DSA-2 was established northwest of Gray and a convoy of 243 trucks with 95 combat loads of ammunition and 50,000 gallons of fuel drove along MSRs Texas and Virginia to reach DSA-2 during the afternoon of 26 February. By now the lead tanks had less than 100 gallons of fuel in their 500-gallon tanks and with units scattered over the desert the problem was solved by junior officers who led convoys on their own initiative to refuel the division by midnight. During the day, another convoy of 96

vehicles reached FOB Cobra with much needed supplies including fuel for the helicopters.

By the evening of 26 February, Luck had re-evaluated his plans in the light of Schwarzkopf's acceleration of the offensive. With Franks' VII Corps closing with the Guards and drawing 50 kilometres ahead of him Luck realised he would have to push eastwards to keep pace and at 20:20 he activated a contingency plan, 'Ridgeway', which called for McCaffrey's division, reinforced by 3rd Cavalry, to push up to the Euphrates then strike east down Highway 8 while 101st Division's attack helicopters, reinforced by Colonel Emmitt Gibson's 12th Aviation Brigade, struck an objective 10 kilometres north of Basra to cut Highway 6, which ran alongside the Tigris. The Cavalry were ordered to take Umm Hajul airfield (Objective Tim) on the corps boundary, to which Peay would move his 2nd Brigade from FOB Cobra and establish FOB Viper, where four gunship battalions (72 Apaches) would shield the northern flank. Johnson's 82nd Division would secure the rear bringing up his 1st and 3rd Brigades to help McCaffrey mop-up near Tallil or Jalibah AB. By the end of the day McCaffrey had established a second



A burned-out Iraqi T-54 MBT, found by advancing Coalition troops. Notable are extra shields over the IR-searchlight on the right side of the turret/left side of the photograph, and over the so-called 'Dazzler' device, designed to disrupt the aiming of anti-tank guided missiles. (US DoD)



Specialists of the Foreign Technology Division inspecting the wreckage of an Iraqi MiG-25 interceptor destroyed by an air strike while inside a hardened aircraft shelter at the Jalibah FOB, in early March 1991. (FTD/USAF)

powerful roadblock across Highway 8 and was in a position to help Franks complete the great encirclement.

## 27 FEBRUARY

During the morning the 3rd Cavalry resumed its advance close to the boundary with VII Corps and exchanged fire with what proved to be engineers of the neighbouring 1st Armored Division, one of whom was killed and another wounded. To avoid future incidents a 5-kilometre no-fire zone was established between the corps, but troops became more wary of engaging targets.

Leahy intended to ensure the isolation of the KTO by taking an area designated EA Thomas, just north of Basra with the landing by 1st Brigade scheduled for 05:00 on 28 February to seize bridges along Highway 6 which ran along the Tigris. To secure his section of Highway 8 he inserted 3rd Brigade during the evening of 27 February while engineers cratered the road surface.

The first stage of his new plan was to secure FOB Viper, some 200 kilometres east of FOB Cobra, where Leahy's 101st Division began to land at 09:23, involving 55 CH-47 and 120 UH-60 sorties which landed 500 troops of 2nd Brigade with 60 TOW-equipped HMMWVs and 18 howitzers. To sustain the newly opened FOB Viper some 30 Chinooks were committed to five-hour, 800-kilometre round-trips to bases in Saudi Arabia, each bringing back some 7 tonnes of fuel, munitions or spares until an overland convoy arrived during the night of 27 February. Meanwhile, Apache units with 64 helicopters began to fly in to use the base to engage targets in Thomas and on the causeway, an area of 160 x 380 kilometres, with the first departing at 14:30. By using thermal imagers, in four hours these claimed 14 APCs, 56 trucks and four helicopters on the ground despite visibility being reduced to less than a kilometre because of smoke from burning oil wells. However, U-2 and satellite imagery on 2 March showed large numbers of Iraqi armoured vehicles had escaped and were in Basra.

Meanwhile McCaffrey renewed his attack with 2nd Brigade striking Jalibah Airfield (Objective Orange) and BP 104 while 1st Brigade drove down Highway 8. After a four-hour rest, 2nd Brigade struck at midnight and by 02:00 had taken jump-off positions south of Jalibah airfield which now came under heavy artillery fire from five battalions of 212th Field Artillery Brigade. At 06:00 the brigade assaulted the airfield, encountering a spirited defence – which damaged two Bradleys – but was overwhelmed and by 10:00. The airfield, including 14 MiG-21s, MiG-29s, Su-25s, and a helicopter, had been taken, although only after another fratricidal incident which saw three Bradleys hit and 10 casualties.

At midday, following heavy artillery and rocket launcher preparations on Tallil AB, followed by 28 close air support sorties, the 197th Brigade stormed the base with Reid encountering weaker resistance than Kern. At 13:00 McCaffrey resumed his attack east on a 50-kilometre front towards the Rumalia oilfields, leaving Reid to mop-up the air base before following the remainder of the division. The 1st Brigade moved along the north side of Highway 8 while 2nd Brigade attacked in the centre with the cavalry on the right. Iraqi command and control was collapsing, and convoys, especially from Guards formations, were attempting to reach sanctuary to the west and north around Basra. The convoys encountered a wave of American armour moving at more than 60 km/h unhindered by enemy artillery which was unable to switch quickly enough to engage the fast-moving juggernaut. Hundreds of vehicles were destroyed, largely from the rear elements of the Faw, Nebuchadnezzar, and Hammurabi RGFC Divisions, with these divisions defeated or bypassed, while huge supply dumps including

1,300 ammunition bunkers were overrun and some 5,000 prisoners taken. When combat elements of Hammurabi were encountered, McCaffrey concentrated the fire of nine artillery battalions which were augmented by an Apache battalion to wreck the escaping formation. By the end of the day, he had advanced some 100 kilometres on a 50-kilometre front, but the operations reportedly revealed problems in the range and reliability of the SINCGARS communications system when it was not supported by extensive satellite communications.

McCaffrey was again a victim of his own success for his soft-skinned supply vehicles could move at only 15–25 km/h off road to bring his front-line troops the vital fuel and ammunition he needed to maintain his advance. He had to husband his resources carefully to ensure his spearheads were not left exposed and helpless due to lack of supplies. But he was reinforced with nine artillery battalions of 18th Field Artillery Brigade and an Apache battalion, mentioned above, and on 28 February planned to renew his offensive eastwards at 05:00.

## 28 FEBRUARY TO 2 MARCH

During the night of 27–28 February Luck, and his fellow corps commanders, learned of the imminent ceasefire but there remained confusion over when it would be implemented, and over the rules of engagement. By dawn McCaffrey was some 50 kilometres southwest of Basra and had helped to isolate the KTO, continuing their advance eastwards until 08:00 then established defensive positions, having advanced a total of 580 kilometres. The corps was credited with the destruction of 360 AFVs, 1,200 trucks and 300 guns for a butcher's bill of 42 combat and five non-combat casualties, including eight killed, while three of the four Abrams tanks hit were repairable.

Yet the corps would be engaged in a pitched battle with the Iraqis several days after the ceasefire came into effect because its forward positions were only 2 kilometres from those of the Hammurabi Guards Armoured Division, which was still largely intact, and McCaffrey's spearheads were covering the main route northwards. For two days these forces came under scattered fire from the Hammurabi Division, although they were not too bothered until 2 March, when they were attacked by a rifle squad with RPGs and anti-armour missiles but this attack was quickly squashed.

At 04:20 on 2 March the Iraqis attempted a breakout with some 200 AFVs striking the 1st Brigade, driving along a section of the causeway which the Iraqis had quietly repaired the previous day. This advance seemed to have been triggered by the uprisings in southern Iraq and an order to advance to support Saddam Hussein and the Ba'ath government against Shi'ite rebels. However, they were driving into a death-trap which came under shell fire from three artillery battalions and an MLRS battery, augmented by attack helicopters. The artillery fired DPICM, and rockets with scatterable mines caused the Iraqis to disperse as they attempted to avoid the enemy and reach sanctuary. The Iraqis lost more than 185 AFVs, 400 trucks, and 34 guns, many of which were simply abandoned before the Americans broke off the action allowing some 40 AFVs and 200 wheeled vehicles to move north.



## 5

## THE KILLER BLOW – VII CORPS' OPERATIONS

Franks' VII Corps, the Jayhawks, was Schwarzkopf's mailed fist but many would later criticise it for delivering what they felt was a slap on the wrist rather than a knockout blow. It was composed of 1st and 3rd Armored Divisions under Major Generals Ronald H. Griffith and Paul E. Funk respectively, 1st Infantry Division (Mechanized) under Major General Thomas Rhame and the 1st (UK) Armoured Division under Major General Rupert Smith. Griffith had his 1st Brigade replaced by 3rd Brigade/3rd Infantry Division (Mechanized) while the corps was augmented by 3rd Armored Cavalry and four Artillery Brigades – the 42nd, 75th, 142nd, and 210th – with 31 tube and MLRS batteries. Franks first faced the slender reed of Major General Ibrahim Hamash's VII Corps with 25th, 26th, 27th, 31st and 48th Infantry Divisions holding the frontier, while the sole armoured reserve was the 52nd Armoured Brigade, and captured Iraqi leaders would later state a total of some 48,000 men.<sup>1</sup> The Iraqi divisional frontages widened from east to west from 10 kilometres to 35 kilometres but each formation had two brigades up some 20 kilometres from the frontier and one up to 60 kilometres in the rear. In addition to divisional artillery the corps had nine artillery battalions with 160 tubes and MLRS. Fortifications were often rudimentary with communications trenches sometimes only 30-46 centimetres (12-18 inches) deep, vehicle revetments were simply piled sand without reinforcement, and there were few fire trenches and little wire. The 26th Infantry Division laid out its positions in a straight line with poorly positioned and protected armour and artillery, while the 48th Infantry Division laid out its trenches in irregular zigzags which provided reinforcing fire and its artillery was well deployed and protected. Just before the Coalition ground offensive began, additional air strikes were directed at 26th and 47th Infantry Divisions and especially an artillery park of 200 guns in the latter's sector. So important was this mission that F-111F Aardvarks were diverted from RGFC targets to it and claimed the destruction of half the artillery. Certainly, Franks' assault attracted little artillery fire.<sup>2</sup>

Behind them lay a far more formidable force in the shape of Major General Ibrahim Abd as-Sattar's II Corps with the battle-hardened 17th Armoured and newly formed 51st Mechanized divisions. Together with Major General Mahmud Faizi al-Haza's 'Al-Jihad' Operational Headquarters, formed on 13 December 1990 with the veteran 10th and 12th Armoured Divisions, all deployed along the axis of the Safwan/al-Jahra road. The 10th Armoured Division had T-62s and the 12th Armoured Division had Chinese Type 59s, both hopelessly inferior to the Abrams. Behind them was the more formidable adversary of the Republican Guards south and west of Basra, under Lieutenant General Iyad Futaykh Khalifa al-Rawi, with the Hammurabi and al-Madina Armoured divisions, Tawakalna Mechanized Division, the Baghdad, Nebuchadnezzar, al-Faw and Adnan Infantry divisions, and the Guards Special Forces Division headquarters. Altogether they totalled some 75,000 men, and despite suffering badly from the Coalition air campaign, US intelligence calculated that they still had some 1,200 MBTs and 500 guns.<sup>3</sup>

Franks' mission was to find, attack and destroy the heart of President Saddam Hussein's ground forces; the armour-heavy RGFC divisions. In order to achieve it Central Command had

expanded Franks' command into a mini-army, more than a traditional corps, with 146,000 soldiers, 48,500 vehicles including 1,587 MBTs and 1,046 Bradleys, 669 artillery pieces, and 223 attack helicopters including the 11th Aviation Brigade. To support this formidable force, US logisticians calculated that for every day of offensive operations the corps needed 5.6 million gallons of fuel, 3.3 million gallons of water, and 6,075 tons of ammunition.

Franks aimed to achieve his mission by initially driving northwards into Iraq alongside Luck, then making a great swing to the right, and then launching an assault eastward to the area of the Iraq-Kuwait border to isolate the forces in Fortress Kuwait in association with XVIII Corps who would operate in the Euphrates valley.<sup>4</sup> Being on the inner circumference of the Great Wheel he had a shorter distance to travel than his neighbour, but intelligence reports and probing attacks during mid-February had shown that VII Corps faced a denser concentration of enemy units than Luck, and his attack was scheduled to begin later, with H-Hour at 05:00 on 25 February. With the theatre reserve, 1st Cavalry Division (Major General John H. Tilelli), demonstrating around the Wadi al-Batin, Franks aimed to cross the border with two divisions and send two more on his left to swing around into Iraq to engage and envelop the RGFC.

Support for offensive manoeuvre was typically provided by short fire-plans from artillery deploying rapidly off the line of march to support the momentum of the advance. In at least one US field artillery battalion the idea of breaking down batteries to fire by platoons was soon abandoned to make C2 easier. Equally, troops had to get used to the notion that firing less than a battalion at a target did not constitute "massing fire." Typically, artillery was brought down 200-300m from friendly forces. During the one-hundred-hour offensive the US element of the VII Corps artillery fired 12,821 shells, 5,634 MLRS rockets, and 25 ATACMS rockets. Not an artillery shell or rocket was fired in response. It was, however, often difficult to acquire target data for such missions. The value of UAVs in providing this service was appreciated when, on 24 February, the 1st Infantry Brigade of the US 1st Infantry Division used UAV imagery to plan its scheme of fire and manoeuvre.<sup>5</sup>

### 24 FEBRUARY

Schwarzkopf tossed these plans into the trash because the initial operations on the peripheries, by Luck's XVIII Corps and Boomer's Marines, saw the Iraqi defence collapse rapidly with COMINT and JSTARS reports indicating that the Iraqis would not try to make a stand in Fortress Kuwait but were more likely to evacuate the country. It was vital therefore to achieve the envelopment as rapidly as possible and he suddenly brought forward Franks' attack to 15:00 on 24 February, confident that the Coalition's technical superiority in electro-optics and GPS navigation systems would allow Franks to 'own the night and the desert.' But this made no allowance for the fact that Franks would have to drive more than 100 kilometres into Iraq across difficult terrain, in bad weather with poor visibility, and then make a 90° turn and advance another 150 kilometres to engage the enemy's most formidable concentration of armour. It also ignored the fact that the VHF FM command network would be rendered unreliable by the meteorological conditions and while Luck had a similar problem this was offset by a generous supply of satellite communications sets. The shortage of these was one reason why Franks had to make frequent visits to his formations.

Franks' troops moved up to the border through rain showers to mid-morning followed by fog and wind-blown sand which reduced visibility to 200 metres even with night vision goggles and thermal

imagers. From dawn Rhame began clearing the ground north of the frontier on the fronts of the 26th and 48th Infantry Divisions to allow the artillery brigades to be brought forward. Many of the defenders were willing to surrender and Rhame recommended pushing on to the Main Line of Resistance (MLR). Franks agreed but there was a two-hour delay for reasons which even now remain uncertain. To make up for lost time Rhame squeezed a 180-minute artillery preparation into 30 minutes and from 14:30 350 guns and 10 MLRS batteries fired 11,000 shells and 414 rockets, leading the 48th Infantry Division Commander Brigadier Saheb Mohammed Alaw to say later 'the earth shook.' He was in no shape to respond as the Coalition air offensive had destroyed 17 of his guns and the American Red Legs, as the artillery arm is known, destroyed 13 artillery positions and wrecked the Iraqi VII Corps' command and control. At 15:00 the infantry struck the MLR, exploiting a gap between the two divisions which had been detected by satellite imagery and supported by 241 tanks, many with mine ploughs, and Armored Combat Earthmovers (ACE) they forced paths through the mine and wire obstacle belts then struck the strongpoint. Trenches were filled in where the defenders continued to resist, but most surrendered or fled and the MLR was secure within three hours with some 1,300 prisoners. The 2nd Cavalry supported Rhame by establishing a 40-kilometre screen to shield him, but in response to Schwarzkopf's directives the regiment began pushing northwards from 14:30 and by the end of the day had advanced 70 kilometres and destroyed a brigade of 26th Infantry Division, but with bad weather reducing air support and vehicles bogging down in the soggy sand, resupply was a problem.<sup>6</sup>

Meanwhile Griffith and Funk drove up to the frontier in battalion battle groups, although a third of the tank battalions remained 'pure' and ready to conduct counterattacks. At 09:12 Yeosock called Franks to see whether or not he could attack earlier than planned and within an hour the corps commander had agreed in principle to begin at noon, but delays at both Schwarzkopf's and Yeosock's headquarters in making the decisions would cost Franks four hours of precious daylight. The two divisions began to cross the frontier, the 3rd Armored Division driving to the strains of the famous Glenn Miller hit *In the Mood* as well as the themes from the movies *Lawrence of Arabia* and *Patton*, played by the divisional band, wearing chemical warfare suits.<sup>7</sup> Once across the frontier the divisions 'circled the wagons' as Franks wanted to ensure his rear was secure and determine exactly where the Iraqi Guards were located as he did not wish to engage them piecemeal. Franks' command style was to meet his divisional commanders, frequently flying over to meet them and brigade commanders once or even twice a day, which gave him a better feel for their situation although it restricted his overall view.<sup>8</sup> He informed Yeosock, who approved his decision, and while Schwarzkopf would later criticise Franks' actions he did not countermand it. Meanwhile, on Franks' right, Tilelli's Cavalry Division, despite its name a mechanized formation with two brigades with a total of four tank and two mechanized rifle battalions,

renewed its attack upon 27th Infantry Division which it had been harassing for weeks. This time they did not hold back but wrecked the Iraqi formation, causing the GHQ to renew its concern about a thrust up the Wadi al-Batin.

At the RGFC headquarters Rawi was told by GHQ of a major penetration in the west but, uncertain whether or not the main thrust was coming from the south, where it was expected, he refused to commit too large a force and assumed the Coalition was still focussed upon a campaign simply to retake Kuwait. He assumed tactical command of the Al-Jihad Headquarters and ordered it to send 12th Armoured Division westwards towards al-Busayyah, VII Corps prime supply base, essentially covering the area from there to the Wadi al-Batin, while 10th Armoured Division was also moved into a blocking position on its neighbour's right. Tawakalna, a mechanized formation, regrouped 20 kilometres to the west to form a 40-kilometre arc to prevent the enemy driving from the al-Busayyah direction up the western side of the Wadi al-Batin and take the road junction where the tracks divided to cross the wadi into Kuwait, anchoring his line in the south on a series of wadis and sabkhas west of the Wadi al-Batin, and in the north with a brigade of the Adnan Infantry Division.

## 25 FEBRUARY

As promised, Franks resumed his advance at dawn crossing what has been described as 'an almost barren landscape in horrendous weather.' The terrain included numerous dry stream beds and the troops moved through weather associated more with Europe than the Middle East; it was cold, with rain showers which sometimes developed into thunderstorms, while overcast skies hindered both air support and resupply. Franks ordered Griffith's 1st Armored Division to drive north to reach Objective Collins some 20 kilometres southeast of Al-Bussayah and then take the town before regrouping and refuelling his forces to push eastwards towards the RGFC whose locations he was now seeking.<sup>9</sup> Meanwhile, Funk's 3rd Armored Division was to follow the 2nd Cavalry on the right. Franks believed he was keeping to the officially approved revised schedule but without directly speaking to him Schwarzkopf wanted him to move faster in the belief that the Iraqis were collapsing but in Franks perhaps blinkered view, there was no evidence to support this claim. There was further confusion when Waller actually informed Franks during the day that he might have to pause on Objective Collins for one or two days, something the corps commander was loath to do.



An M1A1 Abrams of the 3rd Brigade, 1st Armored Division, moves across the desert of southern Iraq. (US DoD)





US Army troops inspecting an abandoned Iraqi BMP-1 infantry fighting vehicle. (US DoD)

Certainly, Franks' formations moved swiftly during the day, overcoming obstacles to advance a maximum of 65 kilometres, the cavalry regiment catching the two armoured brigades of 12th Armoured Division in the early afternoon as they were moving forward to their new positions, although low clouds and high winds severely restricted air support. Franks feared that the cavalry had encountered the Guards but when he realised this was not so he urged the cavalry to continue their sweep eastwards, and towards the end of the day they encountered the Tawakalna outposts. The two armoured divisions also pushed deeper into Iraq, and Griffith's 1st Armored destroyed the 26th Infantry Division's reserve brigade, while Funks' 3rd Armored Division followed the cavalry. Objective Collins was at the base of the high ground and was the gateway to the open desert; it included a small road eastwards from Al-Bussayah to the main highway south from Basra through Safwan into Kuwait. At Objective Collins, Franks regrouped, swinging his front eastwards but resupply was hindered by probing attacks of 12th Armoured Division and because vehicles were bogging down in the wet sand and mud. The M109 self-propelled 155mm howitzers proved to have inferior cross-country performance compared to the Abrams and Bradleys they were supposed to support, but it was still possible to heavily bombard al-Busayyah some 10 kilometres away with 1,500 shells and 350 rockets through the night in anticipation of assaulting the town during the following morning.<sup>10</sup> Franks quickly determined Tawakalna's positions on the as-Salman to al-Busayyah Road, which leads eastward before dividing into two tracks which cross the Wadi al-Batin into Kuwait. He defined two objectives; Dorset lay between the junction where the road split before crossing the wadi into Kuwait, while Norfolk was 25 kilometres west of the wadi, between the junction and the wadis and sabkhas. He ordered Funk to defeat Tawakalna around Dorset while the cavalry would probe Objective Norfolk to determine the enemy positions which would be taken by Rhame's infantry division that had been ordered at 14:00 to march north from the frontier. Franks anticipated the battle would begin late the following day, still ahead of schedule, and five artillery battalions plus MLRS batteries reinforced the armoured divisions. It is worth noting, however, that Franks was still nowhere near engaging the bulk of the RGFC which remained north of the Kuwait frontier covering the approaches to Basra.

Rhame's infantry division, which had as many tanks as an armoured division, had secured the frontier breaches to allow the British division to cross the border and then turn eastwards to shield Franks' communications from any threat from the east and, in the process, pushing most of VII Corps towards the Wadi al-Batin like so much land fill. Although Schwarzkopf's decision meant that British Challenger MBTs had to drive up on their own tracks rather than on the backs of low-loaders, the division crossed the frontier at noon, subsequent moves being hindered by the traffic jam created as Rhame moved north. Led by the tank-

heavy 7th Armoured Brigade, the British engaged 48th Infantry Division and completed its destruction, and efforts by 52nd Armoured Division to support it were thwarted. The British fought on through the night destroying a brigade of 31st Infantry Division and completing the destruction on the 52nd Armoured Division, taking some 1,800 prisoners.

## 26 FEBRUARY

Having regrouped his forces, Franks began to push eastwards through a night of rain, thunder and sandstorms, deployed (north-to-south) Griffith's 1st Armored Division, Funk's 3rd Armored Division and 2nd Cavalry, the latter followed by Rhame's 1st Infantry Division. During the morning, at Yeosock's suggestion, Franks called Schwarzkopf who wanted him to speed up his advance. Schwarzkopf reported that the Iraqi III Corps withdrawal from Kuwait had become a rout, and that tank transporters were assembling behind Hammurabi ready to lift its tanks northwards, and he wanted Franks to prevent the RGFC escaping. Franks' perception was that far from preparing to flee, the mechanized reserves of the RGFC and the associated Jihad Group were actually moving towards him and if he attacked too soon he might be defeated in detail. He pointed out that pursuit was only possible when the enemy had been defeated and the mechanized forces facing him showed no inclination to flee. He had already ordered his corps to destroy the RGFC, and to complete the task by dusk on 27 February at the absolute latest, allowing him to cut the Basra-Kuwait road just north of Safwan (Objective Raleigh). In an effort to strengthen the encirclement, Schwarzkopf then agreed to release the theatre reserve, Tilelli's 1st Cavalry Division, which was released at 09:30 and raced northwards covering 250 kilometres in 24 hours.

Franks was right. Rawi's reaction to the Coalition's offensive in the west, and his detection of a gap between Luck and Franks, meant that in addition to sending the Tawakalna Mechanized Division to prevent any advance up the western edge of the Wadi al-Batin he also moved the al-Madina Armoured Division into blocking positions within the Rumaila oilfield on the Coalition corps boundary. South of this he alerted Hammurabi to be ready either to attack Franks' left flank or to support Tawakalna. Running parallel with the Wadi al-Batin was the Iraqi Pipeline in Saudi-Arabia (IPSA) which linked

Iraq's southern fields with the Saudi east-west pipeline to Yanbu. The IPSA was covered by a berm, which was a useful defensive feature, and a hard-topped road which was a major supply route and was lined with supply, fuel and ammunition dumps. Tawakkalna covered the IPSA with a 10-kilometre deep defensive belt in a flat arc along what the Americans called '73 Easting' which extended 45-60 Kilometres with an outer zone some 8 kilometres to the west. This was organised into battalion combat teams augmented by elements of 12th Armoured Division, most in the usual strongpoints, but they were hastily prepared with shallow trenches and foxholes and low berms with little wire and few mines. US intelligence assessed it as 14,000 strong with 220 MBTs, 126 guns, 18 MLRS.<sup>11</sup> North-to-south Tawakkalna had 29th Guards Mechanized Brigade, 9th Guards Armoured Brigade and 18th Guards Mechanized Brigade, while to the south was the Iraqi Army's 37th Armoured Brigade/12th Armoured Division and 20 kilometres to the north was a motorised rifle brigade of Adnan Division.

Franks' advance was heralded by Griffith's attack upon al-Bussayah, defended by 26th Infantry Division reconnaissance and commando battalions, but from 09:00 their defences were penetrated and their attempts to turn buildings into strongpoints were crushed by tank fire, artillery (1,400 shells and 300 MLRS rockets) and CEVs (Combat Engineer Vehicles) with 165mm guns. Within a couple of hours the Iraqi VII Corps' prime supply base fell into American hands including 100 tonnes of munitions. However, assaulting the town and then mopping up delayed Griffith's progress but during the early afternoon he joined the rest of the corps in the sweep eastwards with all three brigades in line ready to engage the RGFC, who were now barely 50 kilometres away. By late afternoon he was engaging 29th Guards Mechanized Brigade, which was on his left allowing him to sweep behind it before midnight, although this placed his troops west of the al-Madina Division's 2nd Guards Armoured and 14th Guard Mechanized brigades, and when he sent his divisional cavalry to probe al-Madina's positions they came under heavy tank and artillery fire which knocked out five soft-skinned vehicles. During the evening Iraqi artillery supporting Adnan, including the use of a FROG surface-to-surface missile, was extremely effective and wounded 23 troops of 1st Cavalry Division as it assembled behind Griffith but a 75th Artillery Brigade ATACMS battery neutralised the Frog battery.

Funk had pushed forward on a narrower front with two brigades and came into contact with 9th Guards Armoured Brigade and the left of 29th Guards Mechanized Brigade, both supported by the 46th Mechanized Brigade of the Army's 12th Armoured Division and he quickly pinned down the Guards armoured brigade aided by two powerful artillery groupings, each of some 50 barrels, their fire so heavy that it sometimes forced American troops to



A classic photograph of a Challenger of the Royal Scots Dragoon Guards. The Challengers deployed to the Gulf were a mix of Mk2s and Mk3s, though the Mk2s were upgraded in-theatre to standard more similar to the Mk3, especially in terms of adding armoured ammunition storage bins. Note the additional armour, developed at short notice in response to concerns about vulnerability in close quarters fighting in built up areas. This consisted of ROMAR-A "toe" armour (explosive reactive armour fitted to the glacis/hull nose) and VARMA side packs (including additional Chobham armour). Most of the Challengers in theatre received this additional armour, with the exception of some of those with the Armoured Delivery Group. (US DoD)

withdraw. These were so far forward that two MLRS batteries had to be ordered westwards because they could not engage the enemy at minimum range! His 2nd Brigade was unfortunate enough to encounter powerful artillery fire until MLRS eliminated four artillery battalions.<sup>12</sup> Funk had planned an all-night battle to break the enemy by dawn and begin the pursuit but in the confused situation three Bradleys were hit by friendly fire and he decided that when the Iraqis had been defeated by about 03:00 he would pause and regroup to await the dawn, using the time to bring forward his fresh reserve 3rd Brigade to relieve the tired 2nd Brigade.

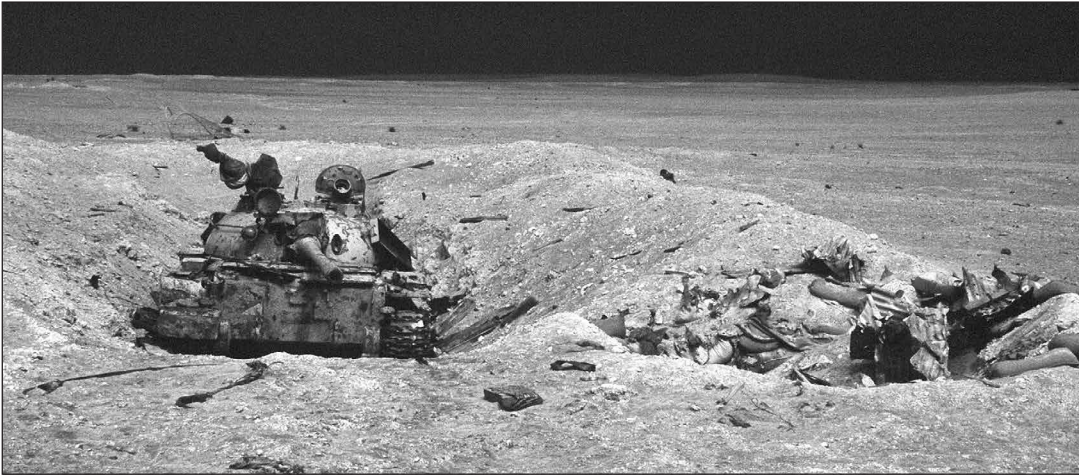
To the south the cavalry regiment discovered and exploited a gap between the 18th Guards Mechanized Brigade and the 37th Armoured Brigade, aided by powerful artillery support including the expenditure of 2,000 shells and 12 MLRS rockets with bomblets. Into this gap came Rhame's division after a 16-hour drive and during the late evening he began engaging both brigades. Here, as elsewhere, the fighting was extremely confused with both sides' armour and infantry intermingled in poor visibility with fire coming from all directions, including those thought safe. The poor visibility often restricted American artillery support with observers in Bradleys having to conduct line-of-sight rather than indirect fire missions. In marked contrast with other sectors, Iraqi troops resisted with determination and skill making frequent counterattacks which sought to exploit their RPGs. But too often they were thwarted especially by Bradleys who detected their movement with thermal imagers and night goggles and stopped them with deadly 25mm gunfire. However, the confused nature of the battle, dubbed 73 Easting, meant there were tragic incidents of fratricide which cost the lives of six Americans as five Abrams and five Bradleys were hit. By dawn Iraqi resistance had been overcome and here, as elsewhere, the Americans were on the slopes of the Wadi al-Batin having been credited with the destruction of 220 MBTs and another 270 AFVs.

Yet the long-awaited clash between Franks and the Guard was a disappointment, for although 73 Easting proved the largest clash of armour, the Iraqis were unlikely to have had more than 250 MBTs, while the Americans had more than 1,000. Their overwhelming





A British FV430-series command post vehicle, seen during a pre-Desert Storm exercises. British vehicles were repainted in an overall sand colour and had black chevrons applied as an identification feature. Regrettably, two Warrior IFVs of the Royal Regiment of Fusiliers were destroyed in a friendly fire incident when attacked by US A-10 aircraft, and nine British servicemen lost their lives. Other "blue-on-blue" incidents occurred, including between British forces, though fortunately there were no further fatalities. (US DoD)



Wreckage of one of about 120 Iraqi tanks and other armoured vehicles knocked out during the British advance. During Operation Desert Storm, 1st (UK) Armoured Division covered nearly 350km within only 97 hours, destroying the Iraqi 46th Mechanized Brigade, 52nd Armoured Brigade, and elements of three infantry divisions in the process. (US DoD)

numbers were not used to out-manoeuvre the enemy but instead to launch a frontal assault in which the outcome was never seriously in doubt. These battles demonstrated the overwhelming qualitative superiority of the Coalition armour and especially the Abrams over the best Iraqi tank, the Soviet-built T-72. Tawakalna's positions were in an area of dense, low, bushes which could hide the T-72 from unaided optical view but not the superior optics of the Abrams which could engage enemy MBTs at ranges of up to 2.4 kilometres, while their opponents' sights extended only to 1.8 kilometres.<sup>13</sup> The Abrams also featured a stabilised gun system which could be kept on target no matter what terrain the vehicle was driving through or what manoeuvres it was having to perform. A further advantage was that the latest M1A1 Abrams carried M829A1 depleted uranium rounds, nicknamed 'silver bullets' which penetrated the laminated frontal armour of a T-72 as easily as a hot knife through butter, causing catastrophic explosions which frequently blew off the turret of the unfortunate victim.<sup>14</sup> One Iraqi tank battalion commander later noted that his battalion of 44 T-72M1 lost 37 to Abrams within six minutes! Even the weather provided no respite for the Iraqi armour and the 11th Aviation Brigade's Apaches roamed east of the Wadi al-Batin to attack 10th Armoured Division during the late afternoon and they were officially credited with 33 MBTs and 22 IFV/APCs.

South of Rhamé, the British division pushed eastwards to grind down the remnants of the Iraqi VII Corps against the Wadi al-Batin, then began moving along the depression. British progress here and earlier was aided by a new 'reconnaissance strike' concept, with the divisional reconnaissance regiment, the 16th/5th Lancers with a squadron of the Queen's Dragoon Guards, placed under operational control of the division's Commander Royal Artillery, to find deep targets for the artillery.<sup>15</sup> The British used the L15 155mm shell with high fragmentation and blast effects, which appear to have shaken Iraqi troops who survived being bombarded with this ordnance with its distinctive sound. The desperate Iraqis fought hard but unavailingly against an enemy of whom they knew relatively little, indeed the 52nd Armoured Division commander would wryly observe that he did not know what a British Challenger tank looked like until one drove up to his command post. There was a tragedy for the British when US Warthogs attacked two Warrior IFVs in error destroying one and causing 20 casualties including nine dead. However, the British success

left Schwarzkopf and Franks with a problem, for it was unclear how the 'Desert Rats' would be used next.

Franks had limited room on his southern flank and could deploy either the British division or 1st Infantry Division to push across the Wadi al-Batin to cut the Basra-Kuwait City Highway north of al-Jahrah. A complication was Yeosock's new demand to clear the IPSA Road which ran north-to-south through the Rumaila Oilfield down to Ruqi on the Saudi border to provide a supply route for the two US Army corps. Franks persuaded Yeosock to withdraw the order allowing the British division to strike eastward towards Objective Varsity, 30 kilometres east of the Wadi al-Batin crossing the mouth of the wadi along the roads which Frank had freed.

## 27 FEBRUARY

Franks still aimed to complete the destruction of the RGFC by dusk on 27 February and now began to advance northeast swinging parallel with the Kuwaiti frontier. Tawakalna had been wrecked and was now no more than a handful of battered battalions. The al-Madina Division had taken up defensive positions to shield the IPSA Road with its 2nd Guards Armoured and 14th Guards Mechanized Brigades west of the road and the Rumaila Oilfield and the 10th Guards Armoured Brigade holding the last ridge before





A smouldering Iraqi BRDM-2 amphibious scout car being passed by an FV430-series command post vehicle of 7th Armoured Brigade, 1st (UK) Armoured Division. (US DoD)



A direct hit on an Iraqi tank, facing the 1st Armored Division, on 28 February 1991. (US DoD)



Units of the VII Corps, US Army, lost several M1A1 MBTs and M2/M3 Bradley IFVs, some to Iraqi fire, but others in fratricide incidents. The wreckage of this Bradley was photographed while being evacuated to Saudi Arabia. (Major Phil Watson)

the mouth of the Wadi al-Batin, a feature dubbed by the Americans Medina Ridge.<sup>16</sup> On al-Madina's right was the Adnan Motorised Infantry Division which was around the Ar-Rumaila Airfield shielding the northern part of the oilfield, while on the left was 10th Armoured Division's 24th Armoured Brigade. The Rumaila oilfield

itself was a long obstacle belt some 5 kilometres wide in which a forest of oil derricks peaked above oil storage tanks, pipelines and buildings providing administration and support for the field.

As dust storms and dense morning fog cleared, Franks was able to use the full power of his corps to grind down the surviving enemy forces in a series of engagements both large and small. Soon after dawn Griffith refuelled and began to bulldoze his way forwards through low rolling hills split by marshy wadis towards Medina Ridge on his right and on his left through flat, sandy terrain, the rain

helping to create a thin covering of grass. Progress was slow as he had to work his way through an Iraqi supply base while it had not been possible to top-up fuel tanks, so his Abrams had only enough for four hours of operations. In the late morning they crossed a wadi in front of Medina Ridge where the Iraqi tanks were dug in on the reverse slope and could not be engaged until after tanks had crossed the ridge and were closer. By this time, they were within the range of the Iraqi guns which blazed away at empty positions on the forward slope of the ridge, and once located by Firefinder counter-battery radar were quickly crushed. For two hours and despite a cloud ceiling of 3,000 ft, the Red Legs, the US Air Force, and Apaches raked the Iraqi positions, before a line of 350 Abrams swept forward engaging the two parallel lines of T-72s and BMPs at ranges up to 3 kilometres. By 16:30 al-Madina had been smashed with 300 AFVs claimed destroyed for the loss of two American lives, one to fratricide.

Half-an-hour later Franks ordered Griffith to resume his attack as soon as possible but the division was short on fuel, despite Funk generously supplying him from his own resources. While two convoys were sent north his tanks were not fully fuelled until the late evening, and this meant the division commander decided to wait until the following morning. Franks had planned for Griffith and Funk to continue their drive westwards while Tilelli's Cavalry Division, which arrived in the afternoon after a 300-kilometre drive, would move around Griffith's northern flank and in a mini double-envelopment link up with Griffith just north of Safwan to isolate al-Madina and Hammurubi. The Medina Ridge battle apparently convinced Franks that the RGFC were still a formidable force, while Schwarzkopf refused to push the corps boundary with Luck further north, so Tilelli had no room for manoeuvre. To his disappointment he had to remain behind Griffith's left while the last intact RGFC armoured force, Hammurabi Division, drove its heavy armour onto tank transporters which then took them north of Basra with an estimated 90% of its tanks, and 75% of its artillery in what the Jayhawk Corps chronicler wryly described as "...in what was perhaps the best-executed Iraqi operation of the campaign."<sup>17</sup> Franks had believed that Hammurabi would be kept in position and its strength eroded by Coalition air power because no-one informed him of the changes in the Fire Support Coordination Line (FSCL).



To the south, Funk, with strong Apache support, completed the destruction of Tawakalna and the remnants of the al-Jihad Group armoured reserve, then crossed the mouth of the Wadi al-Batin into northern Kuwait overrunning a column of abandoned vehicles whose engines were still running. Despite his own fuel problems Rhame also swept across the mouth of the Wadi al-Batin with half his division and plunged deep into northern Kuwait. At one point GPS problems caused one brigade to literally go round in a circle, and during the late afternoon cut the Basra-Kuwait City Highway, Highway 80, between Safwan and al-Jahra and was then ordered to halt for fear he would impede Funk's progress. Also in northern Kuwait was the British division which entered the country at about 09:30 and advanced some 30 kilometres against scattered opposition. While Franks hoped it would press on to the Bay of Kuwait, the confused situation meant that it would not proceed much further eastwards before the war ended.

## 28 FEBRUARY

Franks was apparently unaware of Washington's ceasefire plans until shortly before midnight on 27 February and simply did not believe that he should have to stop when he was on the verge of a great victory, as he quickly informed Yeosock, but when he sought permission to continue his advance it was denied. He went to bed at 01:00 and two hours later he was woken by Yeosock who informed him of the extension from 05:00 to 08:00 local time and wanted Franks to exploit this situation. As the Jayhawk Corps chronicler bitterly commented: "Located almost three hundred miles behind the front lines, living and working in rather pleasant facilities, they had lost the feel of battle. They had also lost their understanding of what five days of continuous operations can do to a combat organization's efficiency."<sup>18</sup> Schwarzkopf and Yeosock now wanted Franks to complete the destruction of enemy armour and seize the junction of the Iraqi Highway 8 and the Kuwaiti Highway 80 near Safwan to block the enemy escape. This was not Yeosock's finest hour, for he failed to indicate that the objective was Safwan, while Schwarzkopf would later claim that Yeosock assured him Rhame's 1st Infantry Division could easily reach the junction before the ceasefire.<sup>19</sup> While Yeosock might have mentioned taking Safwan he appears to have mentioned it in passing and did not order Franks to actually take the town.

The Jayhawks quickly prepared new plans although many formations were short of fuel with Griffith moving off at 07:00 after a 45-minute artillery preparation, and in the remaining hour of the war he was credited with destroying 100 AFVs. He also overran the al-Madina command post and an abandoned self-propelled artillery battalion whose guns were laid and loaded and whose radios were still switched on. Funk set off almost half-an-hour later, but fear of fratricide slowed him down and finally brought him to a halt. Rhame was ordered to take Kuwait's Ar-Rawdatayn oilfield (Objective Denver) but he was not to go much further north and certainly was unaware that Schwarzkopf and Yeosock wanted Safwan. He was actually faster off the mark than Franks' other subordinates but the Big Red One (1st Infantry Division) suffered severe communications problems with the rest of the corps. Objective Denver had been successfully secured, however, when the cease fire took effect, while by that time the British division had also pushed eastwards to link up north of al-Jahra with JFC-North and the US Marines. It was estimating they had destroyed 150 AFVs, including 60 MBTs, and taken 5,000 prisoners.

For all the criticism of Franks, in some 90 hours of continuous movement and combat he had destroyed more than a dozen

divisions and was credited with destroying 2,500 AFVs including 1,300 MBTs and 285 guns as well as taking almost 22,000 prisoners. He lost only 22 dead, many to friendly fire, with a maximum of seven Abrams, 17 IFV/APCs and six soft-skinned vehicles damaged or destroyed, together with two Apache helicopters.

## 6

# THE LIBERATION OF KUWAIT

One of the problems with Schwarzkopf's Coalition planning was that it focussed upon US Army and Air Force activity to the detriment not only of its Arab component but also the US Marine Corps which would work in harness with them. There were no Jarheads (Marines) in the 'Jedi Knights', of whose existence Boomer and his staff were unaware and of whose plans for the Marines and



The primary photoreconnaissance platform of the USAF as of 1991 was the 30-year-old RF-4C Phantom II. Two units equipped with the type – the 38th TRS/26th TRW (home-based at Zweibrücken AB in Germany), and the 12th TRS/67th TRW (home-based at Bergstrom AB) – took part in Operation Desert Storm. This photograph shows an example from the 26th TRW, approaching a KC-135 tanker on the way to a mission over Iraq. (US DoD)



An Astros MLRS of the Royal Saudi Ground Forces seen during an exercise in late 1990. (US DoD)



Senegalese troops of JFC East. (US DoD)



Operation Desert Storm was run at a time when digital imagery and the collection and provision of real-time intelligence still lay in the future. Classic photoreconnaissance was still one of the primary means of obtaining detailed intelligence on enemy dispositions. One of the primary photoreconnaissance platforms of the Coalition were F-14As equipped with the TARPS-pod: this photograph shows deck crews of US Navy squadron VF-84 Jolly Rogers, positioning one such pod underneath an F-14A Tomcat interceptor. (US DoD)

Arabs to pin down the enemy in Fortress Kuwait they remained ignorant.

The Corps was not an organisation which believed in sitting around twiddling its thumbs and Boomer assumed his forces would spearhead the attempt to retake Kuwait and began contingency planning. He established that the initial hurdle was a shortage of integral engineering resources with which to breach the Iraqi defences. Consequently, the initial plan envisaged the 1st Marine Division (Major General James M. Myatt) breaching the defences, supported by the British armour. This would allow the 2nd Marine Division (Major General William M. Keys) to pass through and head for Al-Jahra after which Myatt would strike for Kuwait City while Task Force 158 with the 4th and 5th Marine Expeditionary Brigades (MEB) would pose a diversionary seaborne threat, although they

might land at the port of Ash Shuaybah.<sup>1</sup> The British were not entirely happy at subordinating the Desert Rats to the infantry support role in which the Marines anticipated 17% casualties, and when the 'Jedi' learned of Marines' plan, they too, were unhappy. Even among the Marines, and especially Keys, the plan was unpopular, with a sand-table wargame demonstrating both the difficulties and the prospects of creating an almighty traffic jam which would hamstring a break-out. The British desire to be part of a traditional armoured manoeuvre, especially following their reinforcement from a single brigade to a division, led to their transfer to Franks' VII Corps on 24 December. However, Boomer did receive as a replacement Colonel John B. Sylvester's 1st 'Tiger' Brigade/2nd Armored Division, which arrived on 10 January and was assigned to Keys' division.

Sylvester's arrival boosted the Marines' prospects for he brought extra engineering equipment which augmented equipment obtained from Israel. Keys had the confidence to push for his own simultaneous breach some 10 kilometres to the northwest when Boomer visited him on 1 February and his enthusiasm led the corps commander to give outline approval. The following day Boomer presented the two-division breach plan to Schwarzkopf at an afloat conference in the USS *Blue Ridge* (LCC 19) which included

Boomer's naval counterpart, Vice Admiral Stanley A. Arthur. This consisted of a proposed amphibious assault by Task Force 158, but its prospects were damned by the presence of extensive naval minefields and the prospect of a bloody and destructive battle within Kuwait City. It was decided to abandon plans for a full-scale amphibious assault although Marines afloat would continue demonstrating to work on Iraqi fears in this area. On 6 February Boomer formally authorised the two-division breach and work began on a new logistical base to support Keys, while to plug the gap between his transferred divisions and the Eastern Arab Task Force (Joint Forces Command or JFC-East), 5th Marine Expeditionary Brigade with 7,500 men would be brought ashore.



The Kuwaiti terrain which the Coalition would have to cross consisted of an undulating, gravelly surface with intermittent sand dunes which made defensive preparations easier and rapid assaults harder. The alluvial plain, with its many lakes and channels, as well as the Euphrates and Tigris Rivers, offered barriers to mechanized movement while marshlands would slow or prohibit ground operations if Coalition forces had to manoeuvre close to the Iranian border. At the same time, the wadis provided the Iraqis with opportunities for surprise attacks or counterattacks. The seasonal rain and the northwesterly dust storms (*sharqi-shamal*) threatened to slow, if not stop, ground operations by reducing vision and degrading base construction.

Boomer's Marine-based command, with some 37,000 troops and 11 artillery battalions (some 200 guns), but only six tank battalions (and of those only half had M1A1 Abrams, the balance being venerable M60A1s), would be the spearhead of the Coalition effort to liberate Kuwait from III and IV Iraqi Corps the south and it lay between two Arab task forces. On Boomer's left in the west facing IV Corps was JFC-North (Major General Sulaiman al-Wuhayyib) while Boomer was opposite III Iraqi Corps with JFC-East (Major General Khalid bin Sultan on his right. JFC-North was to seal off

the Iraqi line of communication north from Kuwait City swinging northeast on Boomer's left to Al-Jahra using two Saudi-Kuwait task forces, each of two brigades, as well as Major General Salah Halabi's II Egyptian Corps with two divisions and the 9th Syrian Armoured Division under Major General Nadim Faris Abbas. Meanwhile, Boomer would break through the defences southwest of Al-Jaber AB, which Keys would isolate from the north while Myatt seized it. The Marines would then isolate Kuwait City from the north, a move involving an advance of some 55 kilometres for Keys and 80 for Myatt. On Boomer's right JFC-East under Major General Sultan Abdi al-Mutairi, with the equivalent of six light brigades of Saudi, Kuwaiti, Gulf State, Moroccan and Senegalese troops, would push up the coastal road and actually liberate Kuwait City, although it was uncertain whether or not the Iraqis might turn the city into a miniature Stalingrad. In that event, Boomer's forces would drive into Kuwait City from the west and south. Meanwhile, Task Force 158 together with Coalition naval forces would demonstrate off the Kuwaiti coast ensuring that the Iraqis were always conscious of a potential amphibious assault. While the Marines faced the prospect of a set-piece assault against formidable defences held by the strongest concentration of enemy forces who had long anticipated,

and prepared for, their attack, both III and IV Corps had been severely pounded during the Coalition air offensive, although claims that they had only 600 MBTs and 1,900 guns may have been over-optimistic. There was some concern that the Marines might be out-classed if the enemy used their latest T-72s but USMC M60A1s augmented by TOW-equipped High Mobility Multi-Wheeled Vehicles (HMMWV, also known as Humvees or Hummers), would prove more than adequate against the T-55s and T-62s they did encounter.

Salah Aboud's III Corps in the Kuwait salient, and Aiyad Khalil's IV Corps on his right covering the remaining front along almost the entire length of the Wadi al-Batin, together had 12 infantry and four armoured/mechanized divisions with some 140,000 men. Also in Kuwait, along the country's northern coast from the Iraqi border to the Khalij al-Kuwait bay was Major General Abd al-Wahid Shannan's VI Corps with 10 understrength infantry divisions and a couple of brigades. The defence of Kuwait City itself was the responsibility of Major General Kamel Sajat Aziz's 'Gulf (Al-Khalij)' Operational Headquarters with 36,000 men,



By the time of Desert Storm, some of the USMC's tank units were re-equipped with M1A1 Abrams MBTs, one of which – equipped with an anti-mine plough – can be seen in this photograph taken during an exercise in the final stage of Operation Desert Shield. (US DoD)



An M60A3 MBT of the Egyptian 4th Armoured Division, seen before Operation Desert Storm. Notable is the three-colour camouflage pattern, and the big unit insignia in form of a yellow eagle head (outlined black) inside a segmented black and red circle. (USAF Photo)



whose core was the 11th and 15th Infantry Divisions which had distinguished themselves in the defensive battles around Basra between 1982 and 1988. They were augmented by three ad hoc RGFC division headquarters supported by an armoured brigade, although only the Al Kazima Division, based upon three Army Special Force brigades, was a significant force. The III and IV Corps both manned defensive systems similar to those used during the Iran-Iraq War east of Basra, these being dubbed The Saddam Line by the Americans, though the Iraqi's did not name the defences. The first belt paralleled the border roughly five to 15 kilometres inside Kuwait and was composed of continuous 100-200 metre deep anti-personnel and anti-armour minefields with barbed wire, anti-armour ditches, berms, and oil-filled trenches intended to cover key avenues of approach. In the IV Corps area these defences were covered by triangular battalion-strongpoints. In III Corps these defences acted as a forward defensive zone covered by platoon and company positions with the Main Line of Resistance (MLR) identical to that of IV Corps, but up to 20 kilometres behind the first line. Salah Aboud aimed to catch the attackers between the two defensive lines and destroy them with massed artillery fire and counterattacks, as in the Iran-Iraq War. Both corps commanders had organised their forces in depth during January as GHQ abandoned its forward defence policy, leaving only scout units watching the frontier berms.

The Marines' active defence policy practiced before Khafji increased after the Iraqis had been driven back with numerous infantry and artillery raids, skirmishes and patrols, with fixed and rotary-wing air support, while the battleships *Missouri* (BB 63) and



A dozer-blade-equipped M60A1 MBT of 3rd Company, 2nd Tank Brigade, US Marine Corps, seen during an exercise in overcoming earthen obstacles, November 1990. (US DoD)



M60 MBT of the US Marine Corps, equipped with ERA-blocks for improved protection, and a mine-plough, leading a column of AAV7 amphibious assault vehicles, during a pre-war exercise. (US DoD)



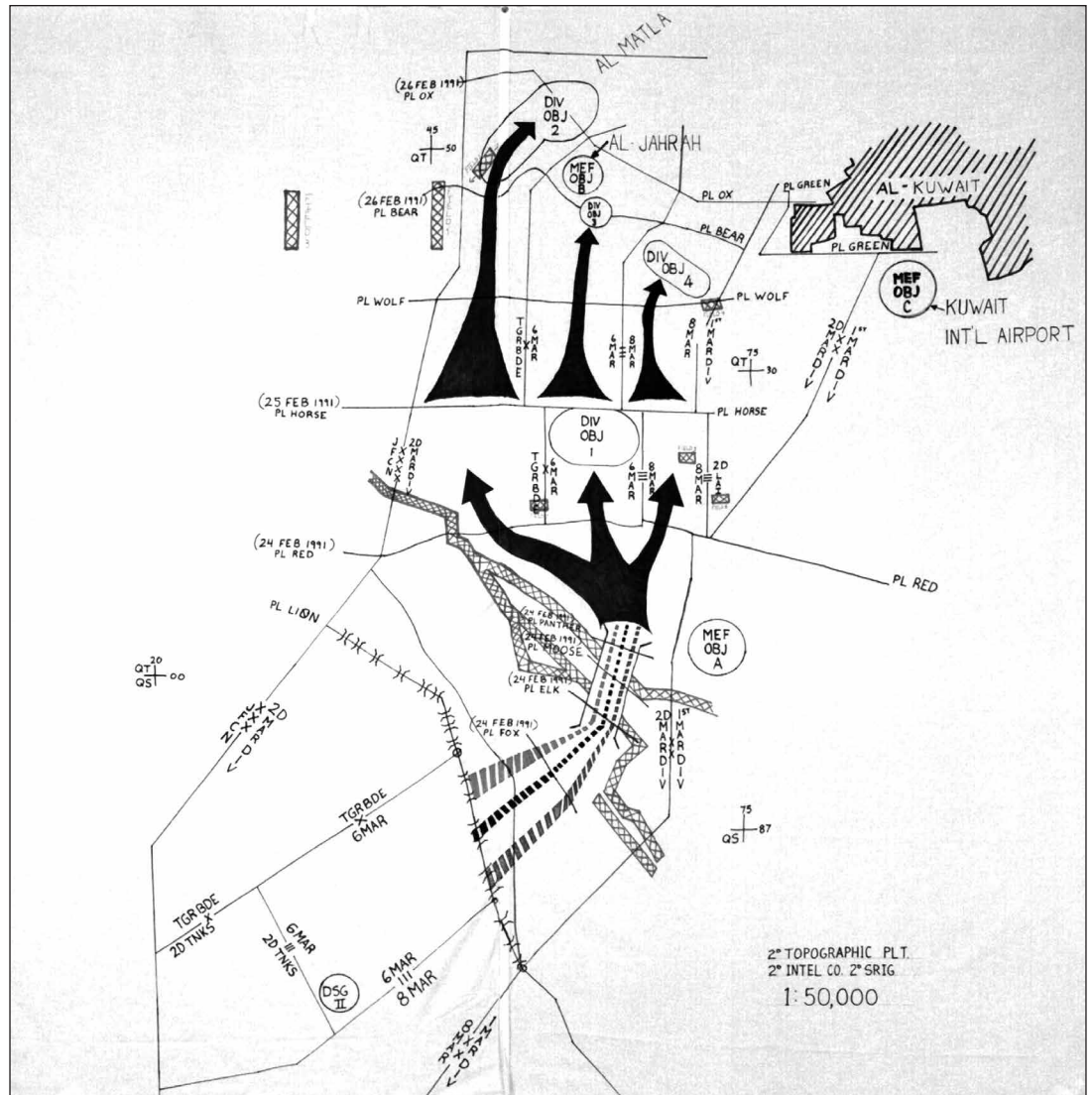
US Marines preparing their M198 howitzer for fire action against Iraqi troops. (US DoD)



*Wisconsin* (BB 64) staged naval gunfire support missions with Pioneer UAVs and forward air observers. During Desert Storm the two battleships conducted 80 fire support missions in which their main armament fired 1,083 shells or 952.5 tonnes of ordnance. 52% of these missions were supported by UAVs with two-thirds of the targets destroyed or badly damaged.<sup>2</sup> The UAVs also flew tactical reconnaissance missions together with Navy F-14 Tomcats using the Tactical Air Reconnaissance Pod System (TARPS), with three optical and infra-red sensors taking forward and oblique images. During the night of 23-24 February, the Coalition forces moved north into their jump-off points with Myatt's 1st Division organised into four task forces based upon Marine Infantry Regiment headquarters; TF Papa Bear (1st Marines), Taro (3rd Marines), Grizzly (4th Marines) and Ripper (7th Marines). Keys' 2nd Division had two similar task forces; TFs Alpha (6th Marines) and Bravo (8th Marines).<sup>3</sup> Myatt faced the 29th Infantry Division while Keys faced the 14th Infantry Division, both Iraqi divisions being no-more than two-thirds of authorised strength and assessed by Coalition Intelligence to have lost 38 MBTs and 120 guns in the air offensive.<sup>4</sup>

## 24 FEBRUARY

During the cold, damp, evening of 23-24 February, the Marines began to infiltrate the minefields and at 04:00 began to clear both obstacles and minefields. In both Marine divisions the Mark 154 line charge launchers, which used a rocket to carry a line of shaped-charge explosives 35 metres across a mine-field, proved a disappointment as the charges often failed to detonate. The mines subsequently had to be removed by tanks with mine ploughs or be cleared by hand, but luckily over the months the wind had exposed many mines which the Iraqis failed to rebury. Keys' 2nd Division struck after a powerful bombardment



A map of the 2nd Marine Division's plan of assault into Kuwait City. (US DoD)



An M84 MBT of the Kuwaiti 35th Mechanized Brigade, seen approaching Iraqi positions in southern Kuwait. The M84 was a Yugoslav-built T-72-derivative, ordered prior to the Iraqi invasion of Kuwait, and delivered to the Kuwaiti forces in exile in Saudi Arabia in 1990. Note the black chevron and the three vertical white stripes applied on the side-skirts as an identification aid. In the background is a US M728 Combat Engineer Vehicle armed with a 165mm demolition gun and towing a trailer equipped with a MICLIC mine-clearing system. (US DoD)

at 05:30, and despite problems clearing the minefields he was able to manoeuvre using TF Alpha and was through the defences by noon. By 16:15 this allowed him to bring up Sylvester's Tiger Brigade on the left and despite encountering small Iraqi armoured forces they



M60A1 main battle tanks of the US Marine Corps seen advancing into southern Kuwait, on the third day of the war. The armour of the M60A1 was of limited protective value by 1991 and so was supplemented by the addition of panels of Explosive Reactive Armour to defeat the HEAT warheads of Iraqi RPGs, ATGMs and tank rounds. (US DoD)



By the time the Marines reached Kuwait City, the bulk of the Iraqi army was in full retreat, leaving behind hundreds of abandoned or destroyed vehicles. This T-72 was captured by the 2nd Marine Division. (US DoD)

were able to wreck 7th and 14th Infantry Divisions then advance and isolate Al-Jaber airfield by 18:00 with some 5,000 prisoners being taken together with a battalion of 35 MBTs. TF Bravo did not move forward until the following morning. Despite the setbacks with mine-clearance equipment, Myatt's men – spearheaded by TF Ripper – had cleared four lanes from 06:00, the first in less than an hour, through the first line of minefields. They then pushed on to the second line in the late morning, lifting mines in the face of Iraqi fire which knocked-out three mine-clearing tanks, until the defences were exposed by 12:15 and the Marines were ready to fight their way through the strongpoints. A set-piece assault began at 16:30 after a 30-minute artillery preparation. Within 90 minutes the Jarheads had broken through, pushed through the al-Wafrah Forest and on into Al-Jaber AB in a succession of actions fought within dense black smoke from burning oilfields and vehicles, and as false warnings forced the attackers to don debilitating chemical warfare suits.<sup>5</sup> Such were the conditions that plans for a heliborne landing on the right were abandoned when the force arrived in 50 CH-46s and CH-53s to find the landing zone obscured by smoke and covered by intense automatic fire from the ground. The Marines pushed on, but TF Grizzly had to take the air base and mop up in the face of artillery fire, and the base did not fall until the following morning, with the Marines claiming to have destroyed 21 tanks and taken 3,000 prisoners. By dusk Myatt was close to the al-Burqan oilfield where he established his forward command post.<sup>6</sup>

By the end of the day Boomer had advanced some 30 kilometres into Kuwait and secured sufficient forward territory for helicopter landing zones which brought forward much needed supplies. During the day the 5th MEB was landed and moved into the gap

between Boomer and JFC-East, mainly to handle the flood of prisoners, with almost 10,000 taken by dusk. The advance threatened to isolate the Iraqi III Corps' left with 8th, 18th, and 42nd Infantry Divisions along the coastal highway. The undaunted Corps Commander, Salah Aboud, despite having limited information decided to launch a counterattack to envelop Keys from the north using 7th Infantry Division (unaware that this had already been wrecked), while the 5th Mechanized Division struck southwest from the al-Burqan oilfield. Together they would secure Al-Jaber AB which would, in turn, allow the 8th Infantry and 3rd Armoured divisions to establish a strong defensive line to the north. During the night his forces moved up, hampered by poor visibility due to smoke, but by dawn they were ready to strike.

On Boomer's left, JFC-North – led by the Egyptian 3rd Mechanized Division – began a delayed attack upon the Iraqi IV

Corps at 15:00, with the defenders responding by igniting oil-filled trenches and using light artillery fire. While the Egyptians were confident enough against the conventional defences, the burning oil-filled trenches unsettled them and when they received inaccurate reports of preparations for an Iraqi counterattack they immediately went onto the defensive in front of their initial objectives. In fact, directly, and indirectly, the Coalition air offensive had weakened IV Corps, whose 20th and 30th Infantry Divisions were no longer effective, while the 21st and 16th Infantry Divisions were falling back toward Ali As-Salim AB. Near Ali As-Salim was the 6th Armoured Division, assessed by Coalition intelligence, and as having lost 100 (40%) of its 249 MBTs and 61 (34%) of its 177 APC/IFVs and was therefore in no positions to conduct a counterattack. On Boomer's right, JFC-East jumped off on schedule from 08:00 with the 8th and 10th Saudi Mechanized Brigades cutting lanes through the first obstacle belt, and then pushed forward through poorly built and sited Iraqi defences, possibly hastily thrown up after the Khafji battle. Their advance up the coastal road was facilitated by both Coalition air support and the big guns of the American battleships.

## 25 FEBRUARY

The sound of the Iraqi vehicles alerted Myatt as early as 01:00 and both TFs Ripper and Papa Bear were ready when III Corps began its counterattack at about 06:00 with the 5th Mechanized Division focusing upon Ripper and the battalion-size reconnaissance force TF Shepherd, while 3rd Armoured and 1st Mechanized divisions and part of 7th Infantry Division struck Keys. There followed five hours of confused fighting in which both sides were plagued by the dense, black, choking smoke which allowed the Iraqis to reach



Myatt's command post before they were driven off. The Marines slowly gained the upper hand, and a brigade commander of the 5th Mechanized Division was reported to have arrived at TF Papa Bear's command post with his command group in three Type 63 APCs and an escorting T-55 and promptly surrendered.<sup>7</sup> General Salah Aboud, buoyed up by widely optimistic reports, would later write: "This action caused the enemy to withdraw from the battleground as our tanks were firing at the enemy tanks across the minefield while it was advancing to stop whatever was left of the penetration."<sup>8</sup>

In reality, the counterattack only delayed the Marines, and once the threat was contained with minimal losses, the Marines and Sylvester resumed their drive northwards as early as 07:30. By dusk Myatt was within sight both of Kuwait IAP and the southern suburbs of Kuwait City, having taken some 1,500 prisoners and claiming the destruction of 100 AFVs. Keys, still shielded from the Iraqi armoured reserve by Sylvester's Tiger Brigade, pushed on to take first Al-Jabir AB and then Al-Jahra by 22:00 despite the efforts of elements of two Iraqi divisions. There was some close combat and the Marines used anti-armour missiles against both armour and defended buildings, with Keys' men claiming the destruction of some 250 MBTs and the capture of 1,100 troops. The advance into Kuwait was less dramatic than that of the Army's corps to the west but there remained strong Iraqi defences. Commanders were anxious to reduce American casualties and they were also anxious not to push the garrison out of Fortress Kuwait before their escape route was sealed. This advance involved considerable use of close air support with AV-8B Harriers, augmented by A-10 Warthogs and F/A-18 Hornets, operating in very difficult visual conditions.

Boomer moved his own headquarters into Kuwait during the evening, hampered both by the smoke and by large numbers of Iraqi troops trying to surrender. The announcement from Baghdad of the withdrawal of their troops from Kuwait was received in garbled form and had shocked all the leaders within the country. As Salah Aboud's troops fell back through Kuwait City he reported to GHQ his 2nd, 7th and 14th Infantry Divisions were no longer effective and had ordered his remnants to form a defensive line near Kuwait City, but then learned of Saddam's order to withdraw. His forces were now squeezed like toothpaste onto the Kuwaiti coastal road system and the withdrawal was rapidly deteriorating into a rout.

On the Marines' left, JFC-North resumed its advance at dawn with the 4th Egyptian and 9th Syrian Armoured divisions slowly following. By the end of the day it had established a 16-kilometre bridgehead but its glacial progress meant that the Iraqi's way out of Kuwait remained open until Keys cut it and it did not reach its objectives until the following morning. On the coast, JFC-East made steady progress against light resistance, aided by a demonstration by 4th MEB off Ash Shuqaybah. An Iraqi attempt to stand at Mina As-Saud, the port area of Kuwait City, by the 8th, 18th and 29th Infantry Divisions was hammered by Coalition air power and the survivors joined the long retreat north. Meanwhile, US Special Forces began to infiltrate into Kuwait City to link up with the resistance and to conduct covert reconnaissance.

## 26 FEBRUARY

On 26 February, for the first time, the Marine advance diverged with Myatt pushing northwest during the morning using (left-to-right) TFs Ripper, Papa Bear and Shepherd, while Grizzly mopped up at al-Jabr AB, hampered less by enemy fire and more by unexploded Coalition ordnance. Ripper pushed northward towards Ali as-Selim AB at a rapid pace, reducing enemy AFVs with TOW where necessary, and encountered only sporadic resistance before running into Iraqi rear defences with wire entanglements and minefields, which forced them to regroup about 13:00. Smoke from burning oil wells and vehicles began to increase in volume and posed a problem when the advance was resumed three hours later. A sandstorm further reduced visibility but the task force succeeded in making sufficient breaches to press onwards to the air base, defended by a battalion of 1st Mechanized Division, which was unable to prevent the Marines securing a bridgehead in the base's defences by 23:00. Shepherd's reconnaissance force pushed northwards, east of Kuwait IAP, encountering strong resistance from an armoured force which had to be suppressed with the extensive use of fixed-wing air support. Despite visibility sometimes being down to a few meters, the Marines took the airport by 03:30 with almost 400 AFVs being claimed, including 320 MBTs, and now linked up with Kuwaiti resistance fighters wearing red and orange arm bands.

By the end of the day Myatt had taken 8,000 prisoners, while Keys' 'bag' of 6,000 required the use of the newly attached 5th MEB to corral and process the huge numbers of men streaming in. Keys still had the vital mission of shutting the door out of Kuwait, and he was determined that if columns of enemy troops passed in front of him he would destroy them. His men drove due north with Alpha pushing to the bay to cut Highway 80 west of Kuwait City, while Bravo – with Sylvester's Tiger Brigade – from midday pushed on to the Mutlaa Ridge, accidentally exploiting the III and IV Corps



A Gazelle attack helicopter (armed with HOT ATGMs) guarding a group of Iraqi Army troops that had surrendered to the Coalition forces. (US DoD)



A T-72 main battle tank of the 3rd 'Saladin' Armoured Division of the Iraqi Army, captured by the US Marines outside Kuwait City. (US DoD)





Carnage on the 'Highway of Death', caused by relentless air strikes by Coalition forces on the withdrawing Iraqi troops, north of Kuwait City, on 27 and 28 February 1991. (US DoD)



Another view of the same scene, showing a seemingly random mix of T-54 MBTs and all sorts of civilian and military vehicles, some knocked out, others abandoned by their occupants. (US DoD)



British troops from 9th/12th Lancers, Armoured Delivery Group, inspecting the burned-out hulk of an Iraqi T-72 very shortly after the ceasefire. (Major Phil Watson)

boundary to overrun elements of the 7th, 14th, and 36th Infantry Divisions as well as brigades of the 3rd Armoured, 1st Mechanized and 2nd Infantry divisions. The mechanized forces tried to cover the southern flank to help the infantry to escape but Sylvester's advance was also delayed for some time by the detection of a minefield which required plough-equipped tanks to breach. Once this was achieved,

resistance came from bunker complexes and armour which was dug in, but most of these vehicles were T-55s which were no match for the Abrams, and Sylvester's progress was marked by increasing numbers of columns of black smoke as they destroyed every vehicle in his path including bicycles. Towards evening they reached the Mutlaa Ridge which, because of its height and location was a key air defence site, but here too the Abrams proved too much and after three hours it was in American hands.

Saddam's order to withdraw had turned the northwards movement into a rout as desperate Iraqis, civilian administrators as well as soldiers, desperately sought to flee. When Sylvester's men

reached the high ground they had an apocalyptic view. The previous night, Coalition aircraft exploiting JSTARS reports had homed in on large columns of vehicles, including civilian automobiles, minibuses and even a fire engine, fleeing northward to create a massive traffic jam estimated at 1,000 vehicles along Highway 80 between the ridge and al-Jahra. Missiles, bombs and cannon-fire raked the vehicles, destroying about a third in what was later dubbed the 'Highway of Death' or Tariq al-Mawt.<sup>9</sup> Iraqi casualties, however, are believed to have been relatively low, despite the vehicular holocaust, at an estimated 300 or less as the troops followed their human survival instincts and when ordnance exploded nearby most debussed, fled into the desert and began making their forlorn way northward on foot. Some certainly abandoned loot, and in April 2017 British armoured vehicle enthusiasts who had bought an Iraqi T-55 for £30,000 found nine Kuwaiti gold bars worth £2 million inside the fuel tank when they began to restore it to working condition. The subsequent fate of the gold is unknown, and it is also uncertain whether or not the finders ever received a reward. Meanwhile, Keys' Marines pushed into al-Jahra despite resistance from elements of 3rd Armoured and 5th Mechanized divisions. The town was reported secure at about 16:00 and the Marines were credited with the destruction of 166 MBTs, although this may be an optimistic figure.

### JFC-NORTH

Finally aware that there was nothing to fear from an Iraqi counterattack, the Egyptian corps accelerated to reach its original objective of al-Abraq before turning east and advancing 60 kilometres to Ali-As-Salim AB. At this point it was supposed to have advanced through the Marines' positions to liberate Kuwait City led by TF Khalid. The Syrian armoured division nominally screened their Egyptian allies but appears to have been marking time and certainly contributed nothing to the isolation of Fortress Kuwait.



## JFC-EAST

JFC-East continued its largely unopposed advance north, with its task forces reaching the western and southern suburbs of Kuwait City their rapid advance apparently came as a surprise to the Americans. During the late afternoon their spearheads began pushing into the city while US Marines and Special Forces struck out to retake the US Embassy, with the Jarheads beating the Green Berets.

## 27 FEBRUARY

On Boomer's left, Keys and Sylvester linked up with JFC-North from 05:50 to consolidate their positions and allow the Arab forces to pass eastwards through their positions to Kuwait City. The Arab caravan began moving eastwards four hours later as the Americans mopped up around Mutlaa Ridge, al-Jafra and the air base, but their war had essentially ended even before the following day's ceasefire. Sylvester's men were credited with destroying 329 AFVs, including 181 MBTs, and capturing more than 4,000 men at a cost of seven casualties, two of whom were killed. To the south, TF Shepherd led the way into Kuwait IAP from 04:40, the Marines' progress delayed more by mines than resistance, and by 09:00 Myatt was able to move his command post into the airport's terminal where it remained until the cease fire came into effect the following day. Boomer's forces had suffered 60 casualties, including 14 dead, and were credited with the capture of 22,300 prisoners, as more and more Iraqi troops saw no reason to die for a lost cause.

## JFCS NORTH AND EAST

The Arab liberation of Kuwait City was hampered by an international dispute as the Emir of Kuwait suddenly demanded that his forces actually lead the way. His troops were well in the rear when he made his demand which angered his Arab brothers and the discussion was, no doubt, robust before agreement was reluctantly reached, allowing the stripped and looted conurbation to be delivered from Iraqi hands. JFC-East secured its final objectives south of Kuwait City, and forward elements moved into the eastern part to link up with JFC-North.

## CONCLUSIONS

Like Operation Desert Storm, Operation Desert Sabre was a watershed in military history for it marked the last conventional campaign of the 20th century involving the use of massed conventional forces; armour, artillery and aircraft, without the fear



A pair of Kuwaiti Army M84A5s moving along the 'Highway of Death', shortly after the end of Operation Desert Storm. Note the three prominent white stripes on the side-skirts and the Kuwaiti flags, intended to avoid misidentification as Iraqi T-72s. (Major Phil Watson)



General Schwarzkopf (left) with Iraqi negotiators, shortly before agreeing a cease-fire that ended Operation Desert Storm, and thus 'The Gulf War' of 1991. About a week later, 540,000 US troops deployed in the combat zone began moving out of the Middle East. (US DoD)

of one side or the other seeking the nuclear option. With its use of sophisticated technology to make surgical strikes, it also heralded a new era of conventional warfare, one which would rely far more upon electronic 'weapons,' unmanned weaponry and logistics as well as smaller, but more lethal, conventional forces.

Yet the conflict also demonstrated the need for a new style of leadership, especially at the very top in an era when modern telecommunications can fuel the desire towards micro-management. At the very top nations require leaders capable of assimilating and assessing a large amount of information, often incomplete, from diplomatic, military and economic sources and formulating a response which creates a balanced and pragmatic response even if this flies in the face of the leaders' personal inclinations. Creating such a response requires the leaders being confident in their advisers, even when bad or inaccurate information is provided.

For all their mistakes, the Bush Administration successfully directed the liberation of Kuwait first by creating a diplomatic-military Coalition including Arab states which would have been unthinkable a decade or so earlier, then holding it together despite the centrifugal forces of national self-interest. Washington also assembled the domestic and foreign resources needed for the military campaign which it launched only after exhausting, and being seen to exhaust, all diplomatic means. Finally, while the armed forces would have wished to drive deeper into Iraq once Iraqi forces had left Kuwait, President Bush halted the campaign as soon as it

achieved its military aims and, by these means, kept the Coalition together by removing fears that it would be a 'colonial' or 'imperial' intervention.

By contrast, Saddam Hussein's leadership was bumbling and inept, with policy driven not by sound advice but rather by the incoherent 'instincts' of a man with little knowledge of, or interest in, the world beyond Baghdad's borders: a man who viewed the situation as reflecting his own prejudices and ignoring the impact of his decisions. He had gone to war with Iran in 1980 believing it was on the verge of collapse and open to a land grab, granting him a special place in the history of not only Iraq, but also the entire Arab World. Saddam thus committed his country not only to one long and debilitating war, but to an entire series of conflicts that ultimately ruined what the British created in the late 1910s. The reason is that Iraq of 1990 was still reeling from the bitter, protracted and ruinous struggle – which it survived only thanks to extensive financial support from numerous Gulf monarchies for which Saddam only had antipathy – when the leader in Baghdad embroiled it in an entirely new, and far more massive conflict. Despite the caution expressed by many advisors, he went on to invade Kuwait for spurious reasons, expecting the world to concur. In doing so he knowingly violated a fundamental Arab belief that they should never fight each other, thus providing Washington with a sound ability to secure support of all the major Arab powers and create the Coalition.

To use an American phrase, Saddam's generals then faced 'a whole new ball game.' Their war with Iran had been largely a confrontation of massed but relatively low-technology forces: when they faced in 1991 a largely Western, and especially American, leadership it was against troops whose doctrines and weaponry had been forged in four decades of preparation for the biggest military clash of the century – one between NATO and the Warsaw Pact. The massed Iraqi forces behind deep defences faced mechanized forces designed to manoeuvre their way to victory using the latest technology in terms of equipment, navigation, electro-optics and fire direction, supported by massed air forces using 'smart' weapons, and once the battle began the Iraqis were bundled out of Kuwait within 100 hours. Yet the Coalition undoubtedly made mistakes and their commanders learned that modern communications can tell you everything you wish to know, except the truth, especially about damage assessment.

Tragically, although the Kuwait Campaign saw a brief moment of Arab unity, it did not affect the overall situation in the Middle East. Arguably, this was never the aim – neither that of the USA or its Western allies, nor that of the major Arab powers. In turn, by leaving Saddam in power, but largely impotent, the Coalition would lay the foundation for the even greater evil of Islamic fundamentalism to raise its hydra head.

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- The United States Navy in 'Desert shield'/'Desert Storm'* (<https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/us-navy-in-desert-shield-desert-storm.html>)

# NOTES

## CHAPTER 1

- 1 USAF planning Congress pp.143-159; *Certain Victory* pp.176-181; Hallion pp.143-144, 150-156; Jamieson, *Lucrative Targets* pp. 17-20. Hereafter Jamieson; *Lessons* pp.389-395; Schwarzkopf p.415; Survey Vol 2 Part 1 pp.55-115,134-182, 188-189, 191-195, 274; Stearns, pp.56-91; Survey Vol 5 Chronology; Westermeyer pp.69-70.
- 2 This was actually an Operational Level objective.
- 3 It was called the 'Black Hole' because, like the astronomical feature, information would get in but nothing would get out. Hallion pp.143-144.
- 4 For USAF deployment see Hallion p.136; Survey Vol 2 Part I pp.45-46, 45 f/n 30, 47, 104,184; Survey Vol 5 Chronology.
- 5 Stearns, p.24.
- 6 For strengths see Table 5.1.
- 7 Survey Vol 5 Table 6. Combat aircraft include tactical fighters, fighter-interceptors, ground-attack and attack, but exclude electronic warfare aircraft.
- 8 Survey Vol 2 Part 1 p.190.
- 9 It is unclear whether or not the additional Eagles were used during Desert Storm.
- 10 Sultan pp.222-225, 231.
- 11 See Table 5.2
- 12 For support forces see Hallion pp.138-139, 187. Survey Vol 5 Chronicle 14 September, 20 December. The tanker figure includes 13 in the Pacific and 94 in theatre.
- 13 See Tables 5.3-5.5.
- 14 Air Survey Vol 5 Chronology.
- 15 For Desert Shield operations and training see Survey Vol 2 Part 1 pp.125-134, 183, 185-187. Tables 46-52, Vol 4 and Vol 5 Tables 54-57.
- 16 Survey Vol 5 Table 46. Dates are for weeks ending during the month January 1991 to week-ending January 14.
- 17 For satellites see NSA articles United States Space Command Operations. Operations Desert Shield and Desert Storm Assessment of January 1991. Jamieson p.16.
- 18 For U-2/TR-1 operations see NSA pamphlet *The Dragon Lady Meets the Challenge* pp.35-44. U-2s flew 284 sorties during Desert Shield and 260 during Desert Storm.
- 19 Survey Vol 5 Chronology.
- 20 Congress p.159-160.
- 21 For Proven Force see Congress pp.164-165; Survey Vol 2 Part 1 pp.185, 338-339, 443, 447-464; Survey Vol 5 Chronology.

- 22 Another 80 USAF combat/combat support aircraft would arrive by 1 February.
- 23 Malovany p.523.
- 24 Woods p.144.
- 25 Woods pp.146, 167-168 f/n 85.
- 26 This paragraph based upon Malovany p.536; Woods pp.144-147, 167 f/n 81.
- 27 Woods p.148.
- 28 For Kari Gordon/Trainor pp.106-110; *Lessons* pp. 408-409; Iraq's Air Defence Command in *Jane's Intelligence Review*; Survey Vol 2 Part 2 p.187, 204-208, 210, 222-226 and Vol 4 Part 1 pp.18-22, 55. Carlo Kopp, Operation Desert Storm on web site. Kari is the reverse French spelling of Irak.
- 29 See Table 5.4.
- 30 Woods pp.148-149.
- 31 US Defense Department, *The Conduct of the Persian Gulf War: Final Report*, Department of Defense, Washington DC, 1992 p.241.
- 32 For technical details *Lessons* pp.436 f/n54, 438 f/n 68.
- 33 See Table 5.5.
- 34 Survey, Vol 2 p.209, f/n 1161 claims Kuwaiti I-HAWKS were not operational but this is contradicted by Woods p.148.
- 35 Woods p.148.
- 36 Military Powers put the number of heavy guns (85-130mm) at 200 p.88. *Lessons* p.134 states there were 2,404 fixed and 6,100 mobile AAA guns.
- 37 See Appendix.
- 38 For Speartip 014-90 and Request for Persian Gulf Related Information.
- 39 Speartip 014-90 and Sadik interview March 2005.
- 40 IrAF activity based upon Survey Vol 5 Tables 46 and 59, and Chronology.
- 41 For IrAF activity in the New Year see Malovany p.525; Survey Vol 5 Chronology.
- 42 al-Samarri, in *Shattering the Eastern Gates* p.250 claims the IrAF had 640 aircraft, US Intelligence put the figure at 700 while a captured Iraqi document said the figure was 997, including 620 fighters. Woods p. 272. The combat element consisted of 84 Mirages, 38 MiG-23s, 18 Su-20s, 68 Su-22s, 30 Su-24s, 62 Su-25s, 174 MiG-21s, 57 MiG-23s, 33 MiG-29s and 7 Tu-16/B-6s.
- 43 For this mission see *Certain Victory* pp.157-160; Hallion pp.166-167, Survey Vol 2 p.282; Survey Vol 4 Part 1 p.159; Woods pp.149, 180, p.251 f/n 36. Even years afterward many Iraqi officers did not believe the attack had taken place.
- 44 For the air offensive see Congress pp.168-234; Hallion pp.166-200; Jamieson pp.41-61, 65-85, 87-97, 08-113, 131-141; *Lessons* pp.396-433, 441-542; Survey Vol 2 Part 1 pp.95-599; Woods pp.269-281. For the first 24 hours Congress pp.168-176; Survey pp.271-326.
- 45 For Nighthawk operations see the NSA document *Nighthawks Over Iraq*. Also Hallion p.165, 167-170, 174, 177, 242.2-200; Survey Vol 2 Part 1 pp.447-455, 472 and Vol 4 Pt 1 pp.68-75, 283-287, 305-306. It was claimed 79% of the 2,041 tons of bombs they dropped were within 3 metres of the aiming point.
- 46 Survey Vol 5 Table 163 shows 282 successful Tomahawk missions. For Tomahawk see Hooton, *Jane's Naval Weapon Systems* pp.355-363; Survey Vol 4 Part 1 p.78-82, 78 f/n 130 has different statistics; Survey Vol 5 Chronology; US Navy H-2-6, Section V. It is claimed some TLAM-Ds had packets of foil to short-circuit electricity power lines.
- 47 This was reportedly the longest combat mission ever flown.
- 48 Air Survey Vol 2 Part 1 p.367.
- 49 For drones see Survey Vol 2 Part 1 pp.294-300.
- 50 Air Survey Vol 2 Part 1 p.309.
- 51 Another 23 aircraft were lost in accidents.
- 52 For tankers see Survey Vol 2 Part 1 pp.251, 251 f/n 329, 257, 261-263.
- 53 Survey Vol 5 Tables 64-65.
- 54 Survey Vol 5 Tables 82-149, 177-178.
- 55 In the Survey many strategic and Scud targets are incorporated in 'Interdiction'.
- 56 Survey Vol 4 Part 1 p.83 f/n 137.
- 57 For cancellations see Survey Vol 5 Tables 164-175.
- 58 ATOs not only allocated targets and assets but innumerable features such as call signs, IFF (identification) codes, and tanker tracks, the ATOs being executed by the TACC. See Jamieson p.58.
- 59 Like Strategic targets these figures are incorporated in the Survey 'Interdiction' column.
- 60 For Offensive Counter Air (OCA) operations against the IrAF infrastructure and strategic missions see Malovany pp.546-547; Hallion pp.188-200; Survey Vol 2 Part 1 pp.241-271, 327-474, 419 f/n 613, 567-599 and Vol 4 Part 1 pp.55-57; *Lessons* pp.396-433, 441-506; Woods pp.189-190, 193-193, 195, 203-205, 253 f/n 84, 272 255 f/n 124, 444 and Table 5.
- 61 Woods pp.181-182, 185.
- 62 IrAF sorties Survey Vol 2 Part 1 p.324 but pp.399-400 state 35 interceptor sorties a day during the first week. The first day's claims were for three MiG-29s, three Mirages, and two MiG-21s: the Iraqis admitted the loss of one MiG-29, one MiG-23ML, two Mirages and two MiG-21s.
- 63 Malovany p.545; Woods pp.189-191 p.253 f/n 74. For a good description of this event from the US Navy's point of view see Marolda & Schneller pp.205-206. If the raid had succeeded it would have doubled oil prices.
- 64 Malovany p.550. Iraqi sources deny Israeli reports according to which the Su-24s in question were 'loaded with gas bombs'. Sadik (interview, October 2007), described their warloads as a combination of anti-radar and precision-guided munitions, and general-purpose bombs.
- 65 The Coalition claimed 33 IrAF aircraft in air-to-air combat, 151 on the ground and 31 captured or destroyed by ground forces (Malovany pp.546-547; Woods p.272).
- 66 Woods pp.192-193, 194, 280.
- 67 For the air defence forces see Malovany pp.547-548; Woods pp.182-183, 187 195.
- 68 Hallion pp.162-177; Woods p.252 f/n 51.
- 69 Marolda/Schneller p.236.
- 70 For operations against ground forces in the KTO see Frostic, *Air Campaign Against the Iraqi Army*; Hallion pp.188-196; Jamieson pp.66, 76, 79; *Lessons* pp.506-542; Stearns, *The 3-rd Marine Aircraft Wing* pp.106-122, 129-145. Hereafter Stearns; Survey Vol 2 Part 1 pp.427-428, 433, 475-566 and Vol 4 Part 1 pp.107-116; Woods pp.186-187, 208, 252 f/n 60, 255 f/n 139. KTO sorties in weeks 1-6 were 938, 2,796, 3512, 3,972, 4,048 and 3,807
- 71 Survey Vol 2 Part 1 p.483.
- 72 For the effect upon the Guards see Jamieson p.66; Woods p.187.
- 73 *Lessons* p.125; Woods p.148.
- 74 A more accurate figure is 1,388 MBTs and 1,152 guns. Jamieson p.137.
- 75 Survey Vol 2 Part 1 pp.481-482.
- 76 Based upon Makki pp. 535, 541 f/n 42. Notably – and contrary to US reports – the RGFC units were never numbered, and while the Adnan Division was frequently described as 'Mechanized' by most of Western sources, all the Iraqi sources stress it was a 'pure' infantry division, reinforced by commando brigades. Finally, the Baghdad, Hammurabi, Medina, Tawalkalna, Nebuchadnezzar and the Special Forces Divisions participated in almost all the Iraqi offensives against Iran in 1988.

## CHAPTER 2

- 1 Woods pp.149-151, 168 f/n 93 & 94.
- 2 Woods pp.149-150, 292.
- 3 Malovany pp.527-529; Woods pp.150, 168 f/n 99.
- 4 For the missile campaign see Congress pp.216-219; *Crusade* pp.81-85, 90-94, 144, 173-174, 176-177, 277, 416-420; *Lessons* pp.854-858; *The Generals' War* pp.228-237; Malovany pp.548-550; Woods pp.182-184, 192, 198, 211, 230, 292-293; Lewis et al.
- 5 Gulf Survey Vol 5 p.544, Table 177-178; Lewis et al, *Casualties and Damage from Scud Attacks*. Air sorties include strategic missions against manufacturing facilities.
- 6 Lewis et al p.33-34.
- 7 Sultan p.258.
- 8 Although many Hussein missiles were used the Coalition referred to the threat as coming from Scuds. For defence against Scuds see, Scales pp.71-73, 181-189; Congress pp.216-219; *Crusade* pp.98-103, 124-126, 140, 145-148; *The Generals' War* pp.209, 234-235, 237-241, 244-246; Hallion pp.177-188, 300-302; *Lessons* pp. 860-877; Malovany pp.550-552; Survey Vol 2 Part 1 pp.377-396 & Part 2 pp.505-516 and Vol 4 Part 1 pp.117-146; *Whirlwind* p.33.
- 9 Congress p.111.
- 10 See Survey Vol 5 Tables 177-178.
- 11 Vol 2 p 505 f/n 1595.
- 12 Woods p.198.
- 13 Survey 2 Part 1 p.387
- 14 Malovany p.552; Survey Vol 2 Part 1 p.377; Survey Vol 4 Part 1 pp.139, 141, 142; Woods pp.290-293.
- 15 This is based upon Hunter's web site article: *Special Operations Forces in Theater Ballistic Missile Counterforce Operations*. Hereafter Hunter; Billiere, *Storm Command* pp.191-192, 199, 221. Hereafter Billiere; Survey Vol 4 Part 1 pp.146-166 (focuses upon air support and operations); Woods pp.184, 193, 195; *Lessons* pp.750-755; *Whirlwind* p.163. The authors would like to thank Professor Albert Grandolini for information on French Special Forces who would create a Special Forces Command in 1992.
- 16 For USAF Special Operations helicopter sorties see Survey Vol 5 Tables 152-156.
- 17 Billiere's father-in-law, Colonel Basil Goode (who died in early August 1990), played an important role in developing the 105mm L7/US M68 gun which had been the standard ordnance in all Western MBTs until the 1970s.
- 18 Survey Vol 2 Part 1 p.458. Special Forces rescued airmen on three occasions and one UH-60 helicopter was lost. *Lessons* p.754.
- 19 For the Iraqi reaction see Woods pp.184, 193, 195.
- 20 See Tucker-Johnson pp.77-78, 119; Woods pp.136-137, 179, 181-183, 210-211, 225-226.
- 21 For Khaffi see Scales pp.189-191; Congress pp.184-186; *Crusade* pp.198-213; *The Generals' War* pp.267-288; Hallion pp.219-223; *Lessons* pp.180-183; Malovany pp.556-563; Morris, *Storm on the Horizon* pp.23-36 deal with preparations and pp.37-272 with the remainder of the battle; Schwarzkopf pp.424-427; Stearns pp.122-128; Sultan pp.362-387; Survey Vol 2 Part 1 pp.501-504; Titus, *The Battle of Khaffi* pp.7-23; Tucker-Jones pp.49-52, 59-63; Westermeyer pp.93-134 also Westermeyer, *The US Marines in Battle: Al-Khaffi; Whirlwind* p.163; Woods pp. 14-27. The authors have also benefitted from correspondence with III Corps commander Major General Salah Aboud Mahmoud through the courtesy of General Aladdin Makki who also



- provided the relevant Chapter 3 of General Salah Aboud's memoirs. Both sources are referred to as Salah.
- 22 Malovany says this instruction was sent on 21 January, but Salah says it was the previous day.
  - 23 Woods (p.28 f/n 6) states it was a follow-on to Guard 'strategic pre-emptive attacks' during the war with Iran, possibly referring to the 1988 offensives.
  - 24 The ground pressure of the MTLB is 0.46kg/cm<sup>2</sup> compared with 0.6 kg/cm<sup>2</sup> in the BMP-1. *Jane's Armour and Artillery 2007-2008* pp.390, 402.
  - 25 For planning *The Generals' War* pp.268-269, 271; Malovany pp. 556-557; Westermeyer pp.97-101, 105-106; Woods pp.14-20. The Westermeyer references are to *Liberating Kuwait*. Most of the divisions had either T-55s with Iraqi-made appliqué armour which could absorb hits by Milan anti-armour missiles, or their Chinese equivalent. But 3rd Armoured Division is reported to have received some T-72s.
  - 26 Salah Memoirs.
  - 27 Survey Vol 5 Table 180.
  - 28 Based upon Frostic Table 6.1.
  - 29 Woods p.21.
  - 30 Woods pp.22-23, 29 f/n 32.
  - 31 Khaled p.362.
  - 32 Scales pp.189-190.
  - 33 Woods p.22.
  - 34 Schwarzkopf p.424.
  - 35 Schwarzkopf p.425.
  - 36 A further 197 sorties were flown against AH 4 (Survey Vol 5 Table 180). According to the Iraqis the Spectre was brought down by an SA-16 'Gimlet' (Woods p.23).
  - 37 For comparison, at the beginning of the air campaign the three Iraqi divisions were calculated to have 603 tanks, 505 APC/IFVs and 216 guns, and by February 23 their total losses were assessed at 84 MBTs, 169 APC/IFVs and 73 guns. The 5th Mechanized Division was assessed as losing 32 MBTs, 145 APC/IFVs and 42 guns.
  - 38 Woods p.25.
  - 39 Salah Aboud calculated that the air offensive cost his corps no more than four casualties daily but that both artillery and air defence units suffered disproportionately. *Memoirs*.
  - 40 Schwarzkopf p.426.
  - 41 Malovany p.560.
  - 42 Schwarzkopf p.427.
  - 43 Woods pp.14-15.
- ### CHAPTER 3
- 1 For Iraqi preparations and forces see Malovany pp.530-533, 535-536, 541 f/n 39 & 42; Woods pp.137-140, 166 f/n 61,204. The strength figures are based on a more realistic estimate of the size of Iraqi forces based upon both Iraqi and Coalition estimates including recognition of the impact of Iraqi leave entitlement.
  - 2 Woods pp.185-186.
  - 3 Woods pp.175-176.
  - 4 Survey Vol 2 Part 1 pp.481-482. Another estimate of KTO initial strength was 336,000.
  - 5 For the defences see Survey Vol 2 pp.269-270; The Iraqi Army pp.86-102; Malovany pp.524-526; Westermeyer pp.64-68; Woods pp.133, 165 f/n 40, 166 f/n 44.
  - 6 Woods p.173-174.
  - 7 Salah memoirs.
  - 8 For the Iraqi Army just before the ground offensive see Woods pp.187-189, 192, 197-205, 207-208.
  - 9 See *Jayhawk!* p.137.
  - 10 Survey Vol 2 Part 1 pp.481-482.
  - 11 *The Generals' War* p.335.
  - 12 For planning the offensive see Scales pp.109-112, 124-133, 137-142, 145-150; *Lessons* pp.79-81, 85-89, 580-582; Sultan pp.306-334; Survey Vol 2 Part 1 pp.199-203, 486-487; *Whirlwind* pp.72-74, 102-103, 106-110, 130-132, 139-151.
  - 13 Scales p.111.
  - 14 Khaled pp.312-313.
  - 15 Scales p.125.
  - 16 The plan is shown in Scales p.127.
  - 17 Bailey p.413. Abrams was the son of the distinguished US general of the 1960s who replaced General Westmoreland in Vietnam.
  - 18 Bailey p.413.
  - 19 See map in Scales p.130.
  - 20 For Selection of VII Corps see Scales pp.131-132, 133-134, 136-137.
  - 21 For reinforcements Survey 5, Chronology; Westermeyer pp.60-63; *Whirlwind* pp.112-118, 120-126.
  - 22 Khaled p.319.
  - 23 Khaled pp.325-331. He noted the Americans, unlike the British, did not keep the Saudis informed on Special Forces activity. With regard to Turkey in opposing a ground offensive both the Defence Minister Safa Giray as well as Chief of Staff General Necip Torumtay had resigned on 19 October, due to political rows, and 30 December over participation in Desert Storm respectively.
  - 24 Khaled pp.227-231, 236; *Whirlwind* pp.132-133.
  - 25 Khaled pp.318, 322-323.
  - 26 *Lessons* pp.581-582.
  - 27 For I MEF planning see Westermeyer pp.70-76; *Whirlwind* p.131.
  - 28 Westermeyer pp.55-57. 'Desert Sabre' was originally 'Desert Sword'. It is unclear when the name was changed.
  - 29 For training see *Whirlwind* pp.147-151.
  - 30 Scales pp.150-154.
  - 31 Survey Vol 2 Part 1 p.493-494.
  - 32 Yeosock would die of lung cancer in February 2012, but his operation in 1991 was apparently related to a gall bladder problem.
  - 33 *The Generals' War* pp.300-301. The reasons for the alleged inadequacy are not given.
  - 34 Bailey, *Field Artillery and Firepower* p.415. Hereafter Bailey.
  - 35 Bailey p.410.
  - 36 Bailey p.414.
  - 37 For the campaign in general see *Lessons* pp.588-589, 610-611, 618-620, 633-634, 643-644, 648.
  - 38 Scales p.222.
  - 39 *The Generals' War* p.301. Waller was later to court controversy due to his vehement opposition to allowing homosexuals to serve in the US armed forces.
  - 40 Scales p.223; *The Generals' War* pp.376-377.
  - 41 *Jayhawk!* p.230.
  - 42 *Jayhawk!* p.231; *The Generals' War* p.398.
  - 43 Scales pp.221-222; Schwarzkopf pp.451-455. For Ground campaign see Congress from p.275ff; For its air support see Survey Vol 2 Part 1 pp.527-566.
  - 44 Woods pp.212-226. The Iraqi signallers overcame Herculean obstacles to maintain GHQ communications although their dedication has been overlooked by everyone except Scales p.232.
  - 45 Scales pp.233, 235-236.
  - 46 Scales pp.236-237.
  - 47 Schwarzkopf p.456.
  - 48 Schwarzkopf pp.455-457, 460; *The Generals' War* pp.381-382, 384, 386-387.
  - 49 Woods pp.226-230.
  - 50 *The Generals' War* pp. 404-405.
  - 51 Schwarzkopf pp.461, 463; Scales pp.251-252.
  - 52 *The Generals' War* pp.396-397.
  - 53 Woods pp.230-236.
  - 54 Schwarzkopf pp.466-474.
  - 55 *The Generals' War* pp.411-413.
  - 56 Woods pp.236-239.
  - 57 For background on the ceasefire discussions *The Generals' War* pp.413-416, 418-419, 422-423.
  - 58 Cordesman p.649; *The Generals' War* pp.427, 429, 438-441.
  - 59 Woods pp.9, 239-246.
  - 60 These figures are from Conetta, Appendix 2 which assumed Iraqi ground strength in the KTO was some 360,000.
  - 61 *The Generals' War* p.430.
- ### CHAPTER 4
- 1 *Certain Victory* p.148.
  - 2 For XVIII Corps operations see *Lessons* pp.589-594, 611-612, 620-622, 634-637, 644, 648-649; Scales pp.216-221, 253-257, 259-260, 302-308, 310-314; *Whirlwind* pp.174-177, 182-183, 187-188, 193-195. Also the US Army Center of Military History, Historical Resources Branch study *XVIII Airborne Corps in Operations Desert Shield and Desert Storm: An Annotated Chronology* available on (<https://history.army.mil/CHRONOS/intro.htm>).
  - 3 Woods p.192.
  - 4 Malovany p.532.
  - 5 The French included six AMX-30s acting as mine-clearance vehicles with former East German Army Soviet-built KT 5M rollers. Information from Albert Grandolini. Timings from Chronology.
  - 6 The road is described by American sources as paved but Iraqi road maps show it was dirt.
  - 7 It appears that the first unit of Peay's division to cross the berm was the Tennessee National Guard's 212th Engineer Company equipped with graders and dump trucks to work on MSR Newmarket which was linked to Cobra during the late afternoon of February 25. *Certain Victory* pp.39-40.
  - 8 Bizarrely, the Americans did not use the conventional term Prisoner-of-War (PoW) but Enemy Prisoner of War (EPR) although few friendly prisoners of war appear to have been taken.
  - 9 Hercules transports dropped more than 100 tonnes of supplies, partly because the growing number of prisoners were consuming the attackers' own rations.
  - 10 Jaliba FOB was a dispersal site for Ali Bin Abu Talib AB, outside an-Nasiriyah.
  - 11 Ali Ibn Abu Talib AB was often referred to as Tallil AB by Coalition sources. See *Desert Storm Vol 1* p.27.
  - 12 The DPICM consisted of 88 M42 and M46 sub-munitions for anti-armour operations, using explosively-formed penetrators, and anti-personnel actions where they fragmented. They were especially effective against area targets,

*Continued on page 72*

## ABOUT THE AUTHORS

### E R HOOTON

E.R. (Ted) Hooton is a retired defence journalist who worked for 30 years with Moench and Jane's before establishing the Spyglass newsletters. Since retirement he has focussed upon military history and has written some 15 books covering subjects as diverse as the Iran-Iraq Tanker War (co-authored with Mr Martin Navias), the Chinese Civil War, the Luftwaffe, the Balkan Wars (1912-1913), the Spanish Civil War, Air Operations over the Western Front (1916-1918) and Eastern Front (1941-1945). With Tom Cooper he has written a four-volume history of the Iran-Iraq War on the ground for Helion's *@War* series.

### TOM COOPER

Tom Cooper is an Austrian aerial warfare analyst and historian. Following a career in the worldwide transportation business – during which he established a network of contacts in the Middle East and Africa – he moved into narrow-focus analysis and writing on small, little-known air forces and conflicts, about which he has collected extensive archives. That resulted in specialisation in such Middle Eastern air forces as those of Egypt, Iran, Iraq and Syria, plus various African and Asian air forces. As well as authoring and co-authoring 30 other books and over 500 articles, he has co-authored an in-depth analysis of major Arab air forces at war with Israel in the period 1955–1973, resulting in the six-volume book series *Arab MiGs*.

*Continued from page 71*

both armour and infantry, indeed the airburst effect against the latter made them more effective than conventional shells, earning the nickname 'steel rain.'

13 Bailey p.417.

### CHAPTER 5

- 1 Although the 52nd is described by US histories as a division it appears to have had only 52nd Armoured Brigade and 11th Mechanized Brigade. Captured Iraqi officers stated the 27th, 30th, 31st and 48th Infantry Divisions had only 29,000 men, of whom 12,000 deserted, and that their air campaign had cost these divisions more than 1,700 men and 40 out of some 60 MBTs. It is likely that many of the so-called 'deserters' were actually on leave. *The Generals' War* p.352.
- 2 Survey Vol 2 Part 1 pp.518-519, 525.
- 3 RAND Study Table 6.1.
- 4 For VII Corps concept see Scales p.149.
- 5 Bailey p.416.
- 6 For VII Corps operations see *Jayhawk!* pp.205-411; *Lessons* pp.594-600, 612-615, 622-629, 637-641, 645-646; Malovany pp.530-533, 535, 541 f/n 39 & 42; Scales pp.223-226, 229-230, 232, 237-238, 240-241, 243-245, 247, 249, 251-253, 261-262, 264-265, 267-276, 279-282, 284-285, 287, 289-294, 296, 298-302, 308-310; *Whirlwind* pp.177-179, 183, 186, 188-189, 192, 195-197.
- 7 *The Generals' War* p.379.
- 8 *Jayhawk!* p.216.
- 9 An Abrams required refuelling every 6-8 hours.
- 10 For the problems with the M109 see Bailey p.411 f/n 264.
- 11 '73 Easting' is a term used with the Universal Transverse Mercator (UTM) system readable on a GPS receiver. 73 Easting is the north-south coordinate line, with most of the 60 UTM zones divided into 60 zones each of six degrees of longitude and 20 latitude bands each of eight degrees.
- 12 In the days until the cease-fire VIIth Corps' MLRS were credited with destroying another 72 guns. Bailey p.418.
- 13 For tank engagement with Tawakkalna Division see Scales pp.1-4.
- 14 During the Second World War on the Eastern Front German Tiger tank crews joked that when they encountered Soviet T-34: "When a T-34 meets a Tiger it takes its hat off." However, the depleted uranium rounds have produced major health and environmental concerns and are reported to have contaminated the desert battlefields.

15 Bailey p.412/f.n 268.

16 US sources say the ridge was held by 3rd Guards Armoured Brigade but this was actually a Special Forces unit in the Special Operations Division RGFC.

17 *Jayhawk!* p.309.

18 *Jayhawk!* p.388.

19 *Jayhawk!* pp. 393, 398; Schwarzkopf pp.547.

### CHAPTER 6

- 1 See Westemeyer p.136 for diagram of Iraqi coastal defences in Kuwait.
- 2 US Navy in Desert Storm Appendix G Naval Gunfire Support.
- 3 A Marine infantry regiment normally had three integral rifle battalions. With the exception of 3rd Marines all the task forces were flexibly organised with rifle battalions from two or three different regiments. Westemeyer Appendix A.
- 4 RAND study *Air Campaign Against the Iraqi Army in the Kuwait Theater of Operations* Table 6.1.
- 5 Their supposed similarity to a well-known children's character led the British Army to refer to these outfits as Noddy Suits.
- 6 For the US Marine Corps operations and those of their Arab allies on the flanks see Khaled pp.391-413; *Lessons* pp.581, 600-609, 615-617, 629-632, 641-642, 646-647; Malovany pp.530-533, 535, 541 f/n 39 & 42; Schwarzkopf pp.454-457, 460-462, 464-467; Westemeyer pp. 64-76, 135-208; *Whirlwind* pp.179, 182, 186-187, 192-193, 197; Woods, pp.202, 209-212, 223, 225-228, 234-239.
- 7 The unit is reported to be the 22nd Brigade but this appears to have been an infantry element of 8th Infantry Division.
- 8 Woods p.226.
- 9 Tucker-Jones pp.99-100